FIRESTONE
Asphalt Roofing

Agenda

- Asphalt basics
- Modified Bitumen
- **Attachment methods**
  - **Mopped into base sheet with asphalt**
  - **Torch applied onto base sheet**
  - **Fully adhered with MB Cold Adhesive**
  - **Self Adhered Base Sheets**
- Installation basics
- **Do’s & Don'ts**

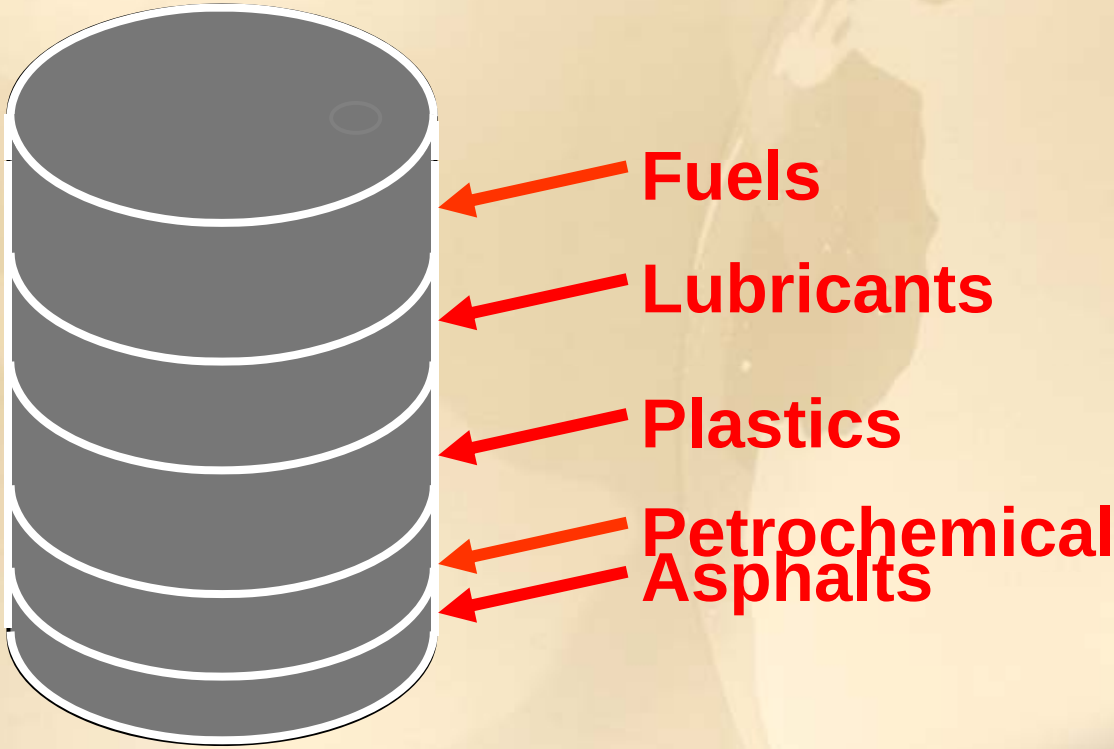
Asphalt

- Highly waterproof and durable
- Naturally strong adhesive
- Used for waterproofing dating back to the ancient Egyptians
- Resistant to most acids, alkalis and salts

Asphalt Roofing

- Hot asphalt is the adhesive and the waterproofing between Built-Up Roofing layers (plies).

Residual Asphalts from Petroleum Distillation



Asphalt Terminology

- Blowing temperature
- Softening point
- Equiviscous temperature (EVT)
- Asphalt fallback
- Flash point
- *Alligatoring*

Blowing Temperature

- Asphalt used for roofing applications is treated (oxidized) by blowing air through it at elevated temperatures to give it desirable characteristics
- Higher blowing temperatures result in asphalts with higher viscosity or less flow

Equiviscous Temperature (EVT)

EVT, the temperature at which a bitumen attains the proper viscosity for BUR application-it is marked on every container

Softening Point

- The temperature at which the asphalt changes from a moldable solid to thick, flowing liquid
- Commonly confused with the melting point
- Four different grades of roofing asphalt are defined by ASTM Standard D312

Asphalt Fallback

When asphalt is heated to extreme temperatures or held above its final blowing temperature it will soften.

This phenomenon is called “fallback” because the asphalt has become softer than it was when it was packaged.

Slippage is the most common problem associated with asphalt fallback

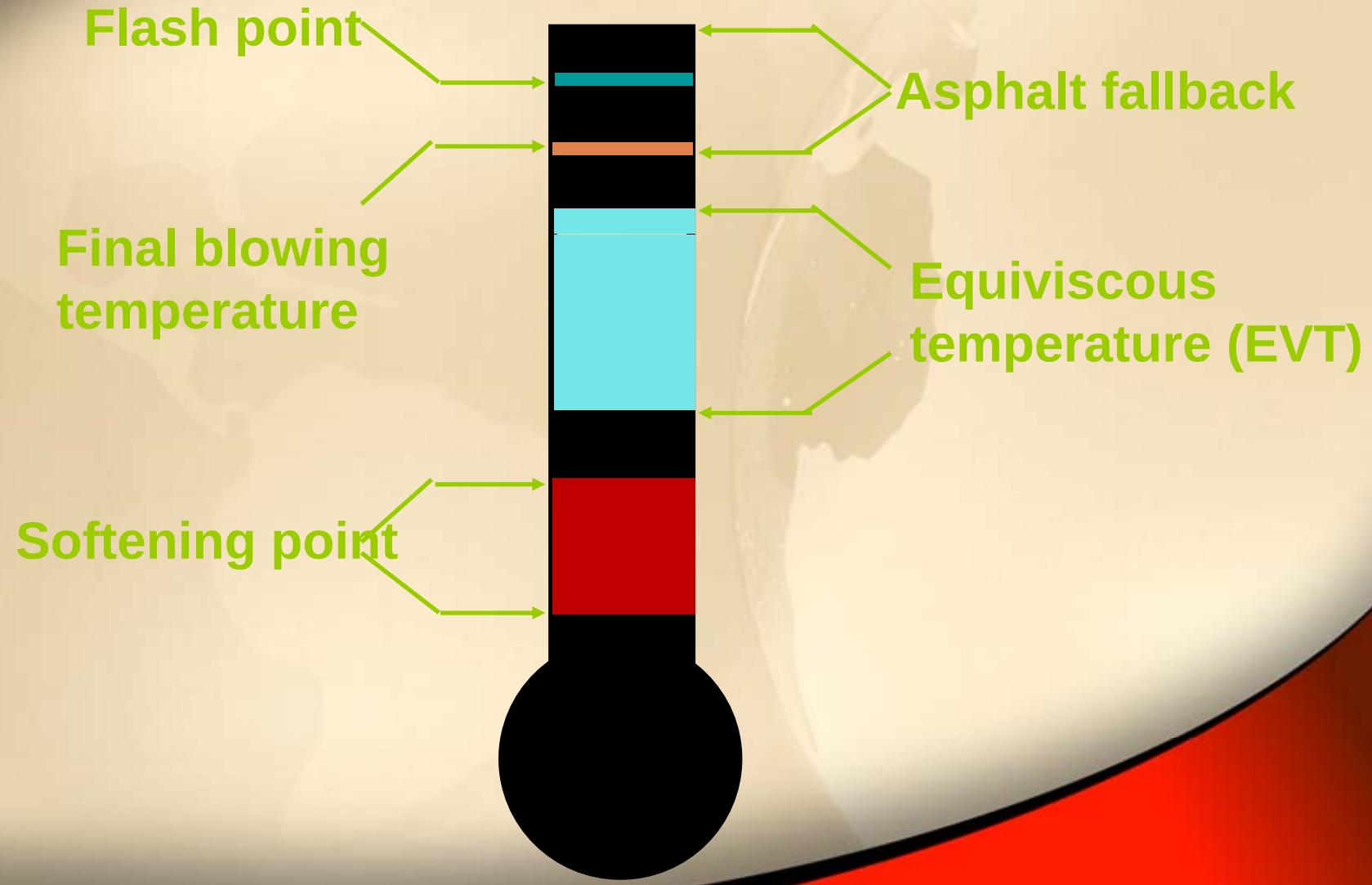
Most manufactures require a minimum Type lll asphalt due to lower softening points of Types 1&2

Steep asphalt is more susceptible to softening-point fallback than dead level

Flash Point

- The temperature at which the asphalt vapors will ignite momentarily in air, in the presence of a small flame
- Kettle and tanker temperatures are usually maintained at 25° below the flash point

Temperature Comparison



Asphalt Aging

"Alligatoring"

Is the cracking of the surfacing bitumen on a bituminous roof or coating on a SPF roof, producing a pattern of cracks similar to an alligator's hide. The cracks may not extend completely through the surfacing bitumen or coating

Left unattended, cracks and splits eventually develop. Water will pierce the roofing system and cause undetected damage in the roof system. As the surfacing layer fails, the fiberglass reinforcement underneath is exposed and becomes brittle. Membrane failure inescapably follows

Mopping Asphalt Types

Mopping Asphalt is typically applied with a cotton or fiberglass mop

Roofing Asphalt

- Typically Comes in 100 pound kegs
- Must be broken up into pieces and melted prior to application

Rubber Modified Mopping Asphalt

ASTM D 6152, SEBS Mopping Asphalt

- SEBS is a *heat and light stable* rubber polymer for use as a mopping asphalt
- Tough and *flexible polymer modified bitumen*

ASTM D-312 Asphalt Types

	Softening Point	Maximum slope, in./ft
Type I Dead level asphalt	135° to 151° F	¼” per. ft
Type II Flat asphalt	158° to 176° F	1 ½” per. ft
Type III Steep asphalt	185° to 205° F	3”per. ft
Type IV Special steep asphalt	210° to 225° F	6” per. ft

(Required for 20 year a Red Shield Warranty)

Why Hot Asphalt is Disappearing

- Trained applicators declines annually
- Continuous monitoring during application is required to guaranty the quality of the finished roof
- Declining number of asphalt refiners
- Cost of crude oil is unpredictable
- Onsite hazards associated with 450ºF material curtails building owner acceptance
- Asphalt paving uses 90% of US asphalt
- Limited availability during the paving season, April to October
- Transporting hot asphalt by tank truck requires a special license and increased insurance


3-Coursed Outside Corners Is Not An Approved
FIRESTONE Detail

Modified Bitumen System Types, Coatings and Application Methods

Modified Bitumen Roof Membranes

Two types

SBS - Rubber

APP - Plastic

Granule Surfacing

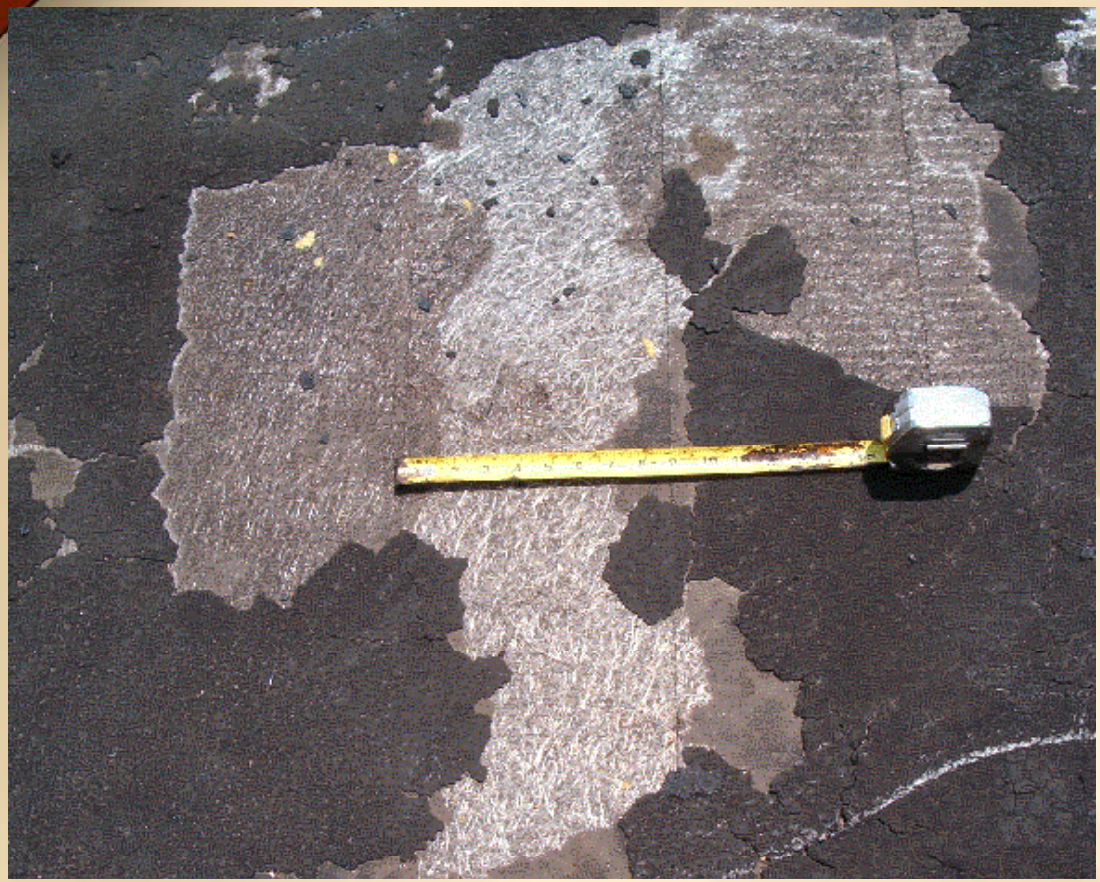
APP and SBS systems:

Aesthetics

- Many colors available

ULTRAWHITE & Acrylic coated meet EPA Energy Star criteria

WHY COATINGS



Fiberglass mat near the top of a modified sheet will not stop deterioration

New High Reflectivity Products for Asphalt

- Two Coat Acrylic Roof Coating System
  - First acrylic coating systems that
    - Bond well to smooth asphalt: BUR or APP
    - Do not stain from asphalt oils
    - Improve ponding performance
  - Meet EPA Energy Star and the Cool Roof Ratings Council requirements for both reflectivity and emissivity
    - No aluminum coating can do this

Two Coat Acrylic Roof Coating System

Acrylic Top Coat being spray applied over Base Coat on a six year old APP Granule roof in AZ

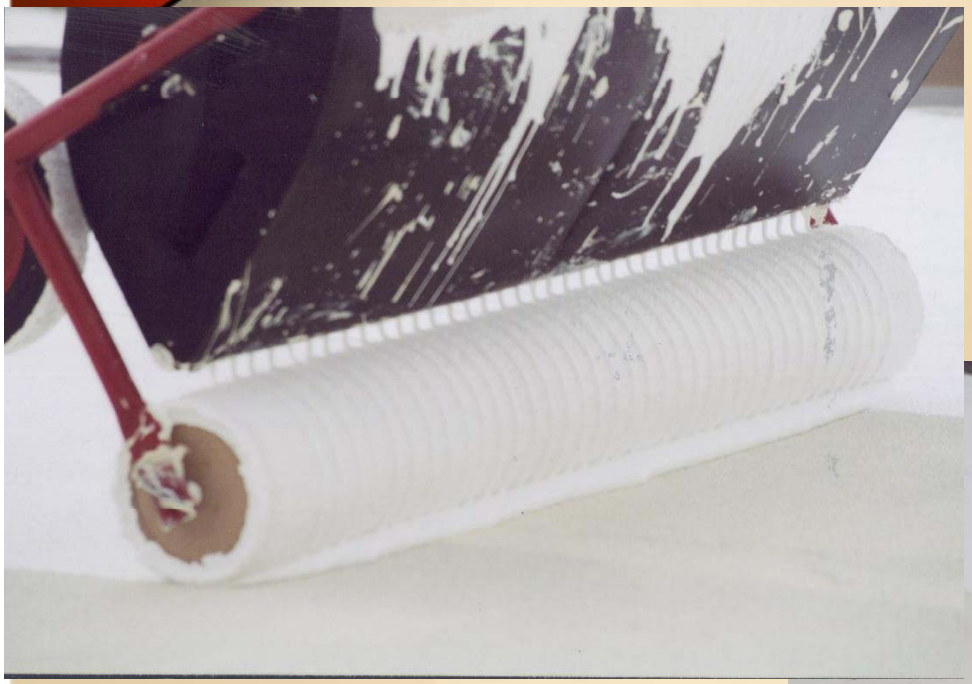
Acrylic Roof Coating System on Granule Surfaced Modified Bitumen

Before

After

Acrylic Base Coat with SuperSpreader over SBS Granule roof

Acrylic Base Coat



SBS Hot Asphalt Application

The asphalt temperature must be a minimum of 400°F at the point of contact with the membrane. Asphalt must be type III or IV or Firestone SEBS asphalt.

Hot Application Requirements

- Remove all of the roll tape before installing the SBS sheet.
- The asphalt temperature must be a minimum of 400°F at the point of contact with the membrane. Asphalt must be type III or IV or Firestone SEBS asphalt.
- Allow rolls to relax prior to installation. Re-roll just prior to installation.
- Laps of SBS cap sheet should never fall on top of base sheet laps.
- Cut bottom sheet laps at a 45° angle as shown in Firestone Detail MB-LS-1.
- Bleed-out should be no more than 3/4" wide
- All side laps must be a minimum of 3” and all end laps must be a minimum of 6”
- Broadcast granules in bleed-out

APP Torch Application

APP Torch Application

•Remove all of the roll tape before membrane installation.
• Allow rolls to relax prior to installation. Re-roll just prior to installation.
•Laps of SBS cap sheet should never fall on top of base sheet laps
•All side laps must be a minimum of 3” and all end laps must be a minimum of 6”
•Using a "hook" or "cane" tool to move the roll, heat weld the re-rolled portion of the sheet. DO NOT STEP ON FRESHLY HEAT WELDED SHEETS! Be alert to insure the lap area of the installed sheet is heated, as well as the bottom of the sheet being applied.
•The welding temperature is correct when a 1/8 to ¼ inch wide flow of bitumen is extruding from the side lap.
•Cut bottom sheet laps at a 45° angle according to Detail MB-LS-1.
• Embed granules on the receiving surface by heating the surface and toweling-in all granules until a uniform black surface coated with compound is achieved.

Cold Adhesive Application

¼ inch notched neoprene squeegee delivers proper amount of cold adhesive

Cold Adhesive Spray

Multi-Purpose MB Cold Adhesive Applications

- Apply Firestone Multi-Purpose MB Cold Adhesive at a rate of 1-1/2 to 2-1/2 gallons per 100 ft2

- Fold the cap sheet into the adhesive and broom into place. Adhesive should not be left open more than 10 minutes prior to installing the sheet.
- Cap sheet application can be completed by applying cold adhesive to the bottom surface of the side and end laps to be mated, or by heat fusing with a propane torch or an automatic heat welder.

1. Adhesive Temperature must be above 65ºF prior to pumping
2. Minimum Pump Requirements = 4,000 p.s.i. @ 5 gallons per minute.
3. Maintain 95 to 110ºF at point of application
4. Use ¾ inch ID or larger hose with 50 foot—½ inch ID whip at the end
5. Avoid siphon type pumps

Spray application

Cold Adhesive

Multi-Purpose MB Cold Adhesive

Horizontal application only

Seams
Vertical Flashing
Target Patches

Cool Adhesive

Multi-Purpose MB Flashing Cement

Vertical or Horizontal application

Materials Storage At Job Site

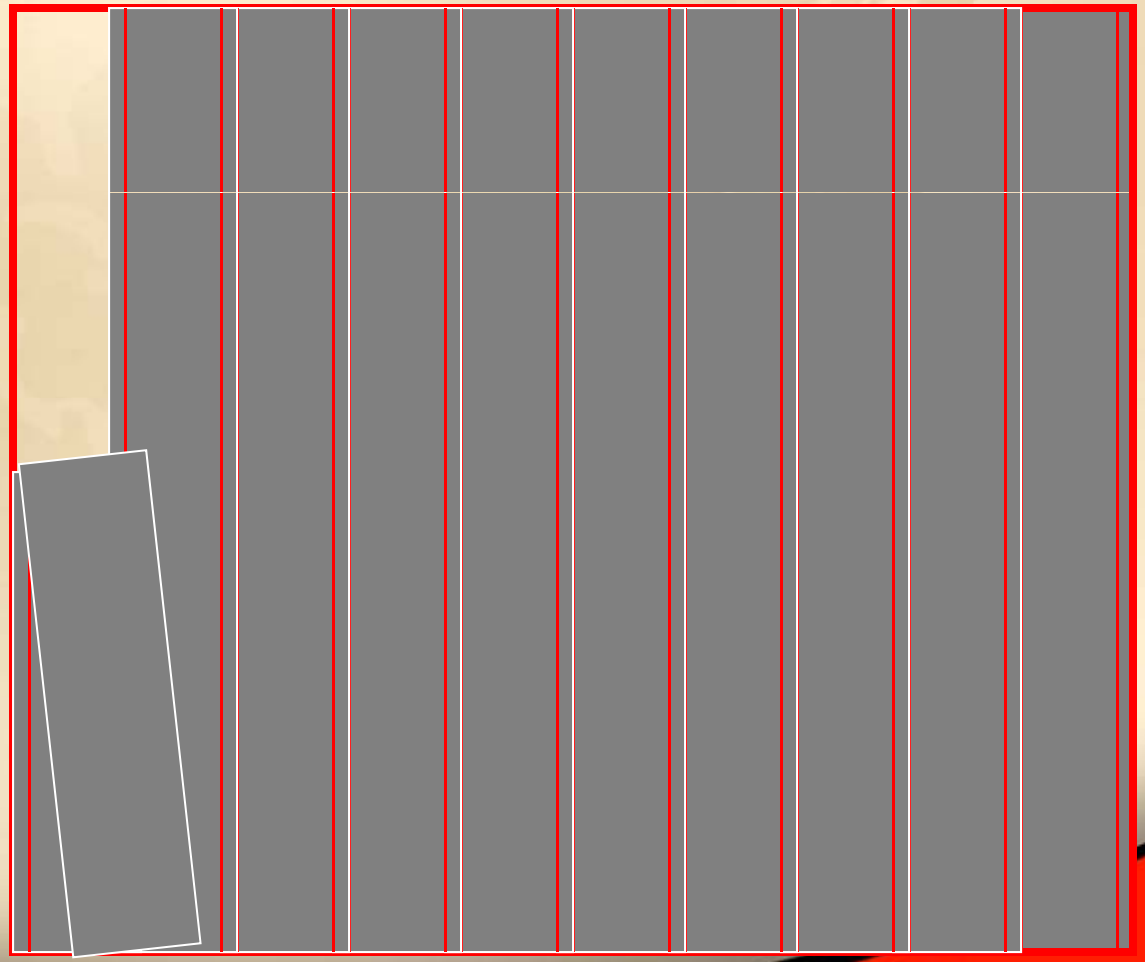
Heat provided by 100 watt light bulb inside storage box

Suggested Application Techniques

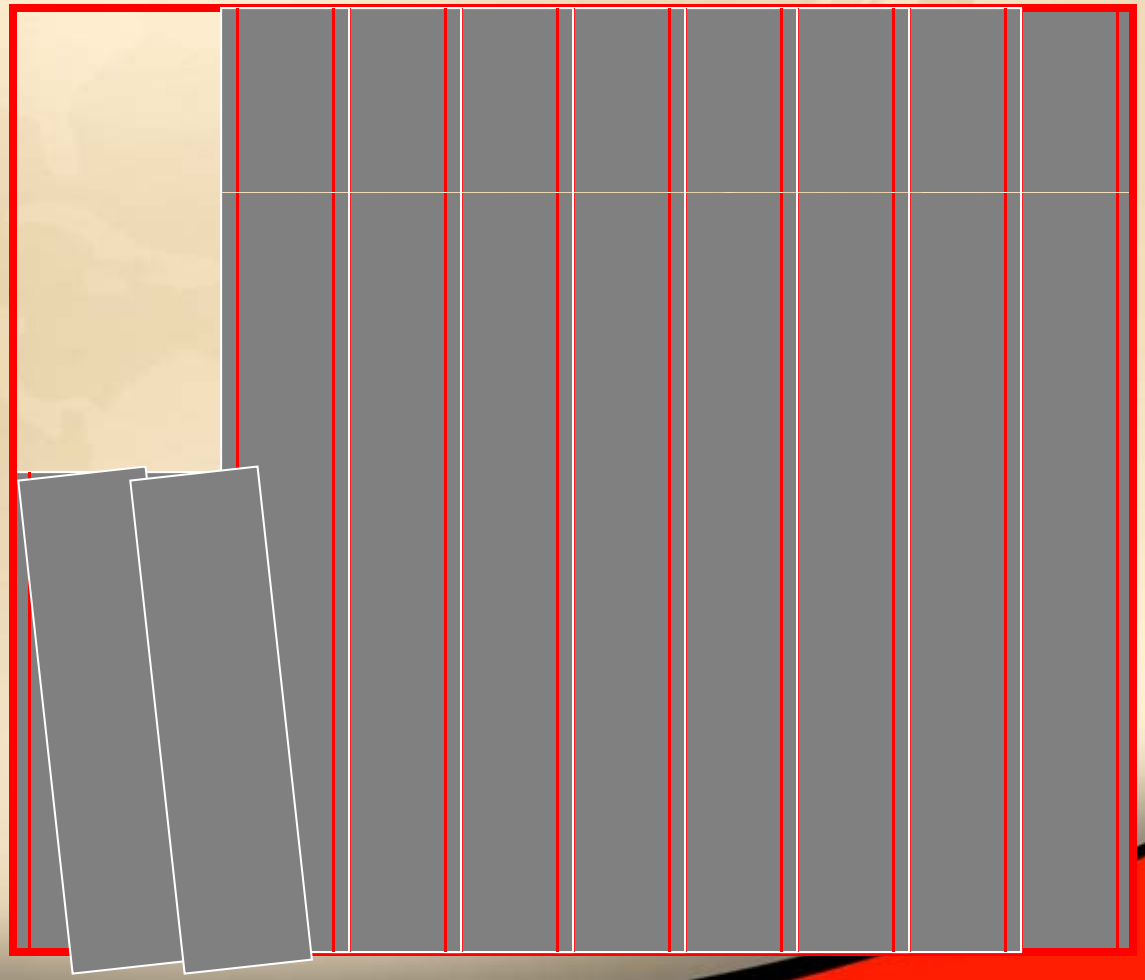
- Conventional Staggered Roll Roof
  - A line of rolls are relaxed and installed one at a time
- Roll block approach using three man crews
  - Rolls are applied in blocks of ten, then joined with individual rolls by multiple small crews

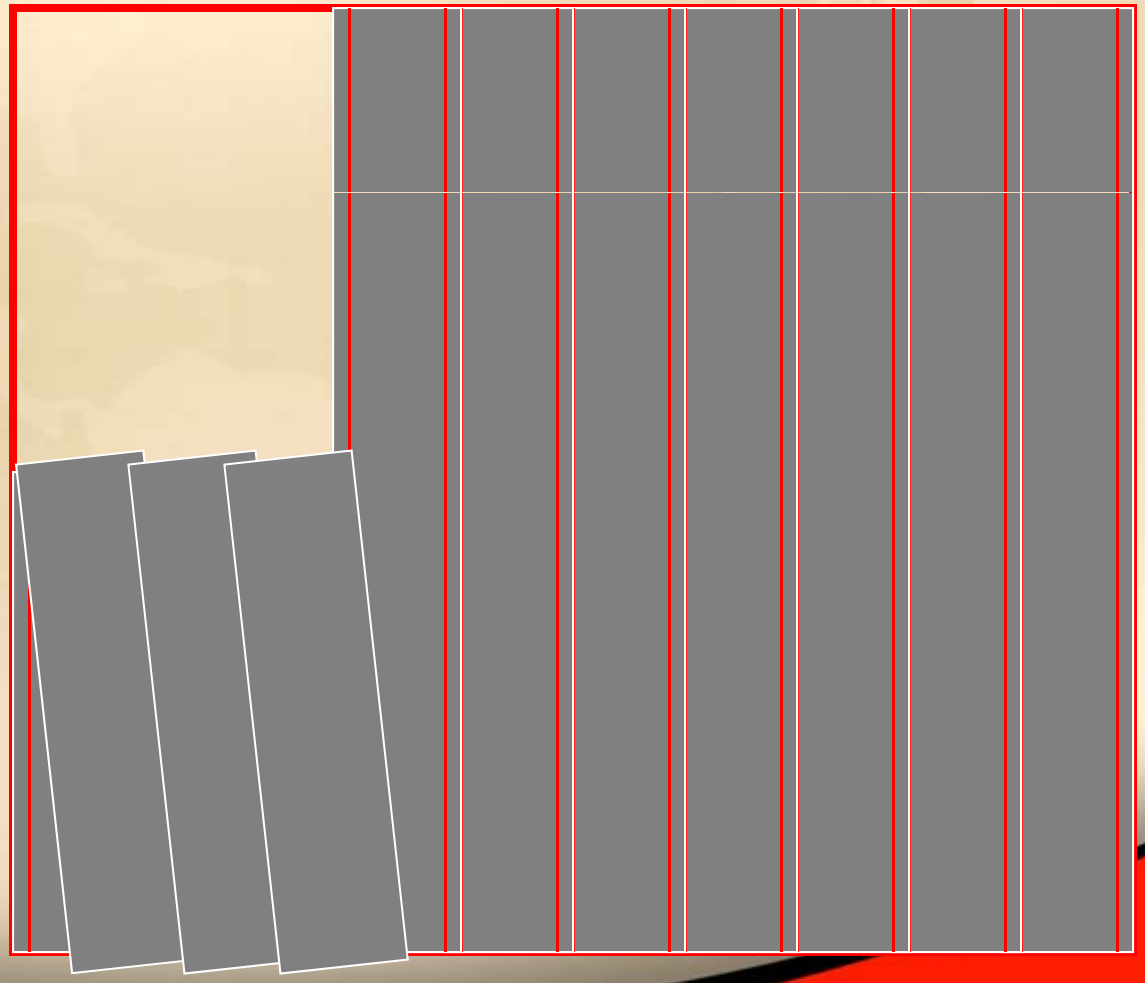
Lay out ten rolls overlapped

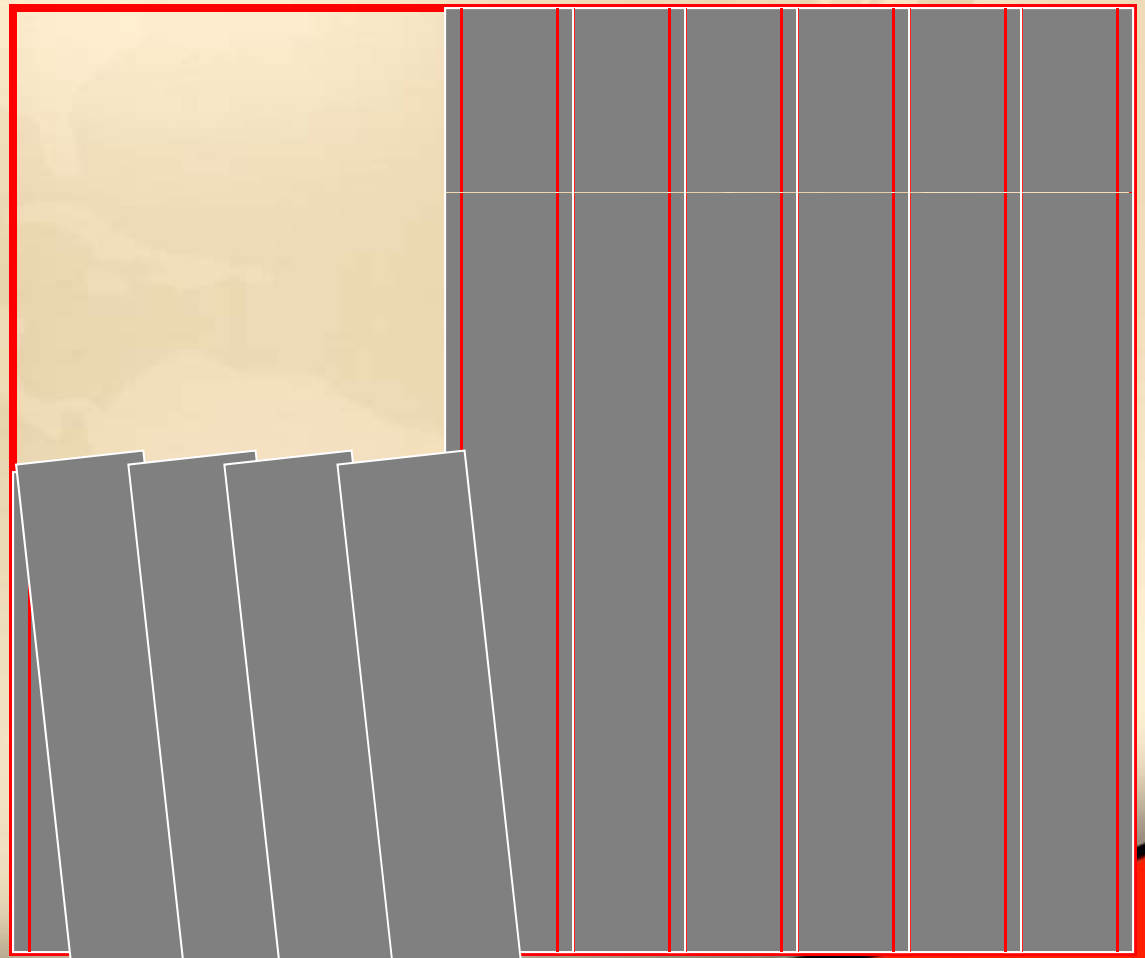
Starting with top roll, fold back on itself

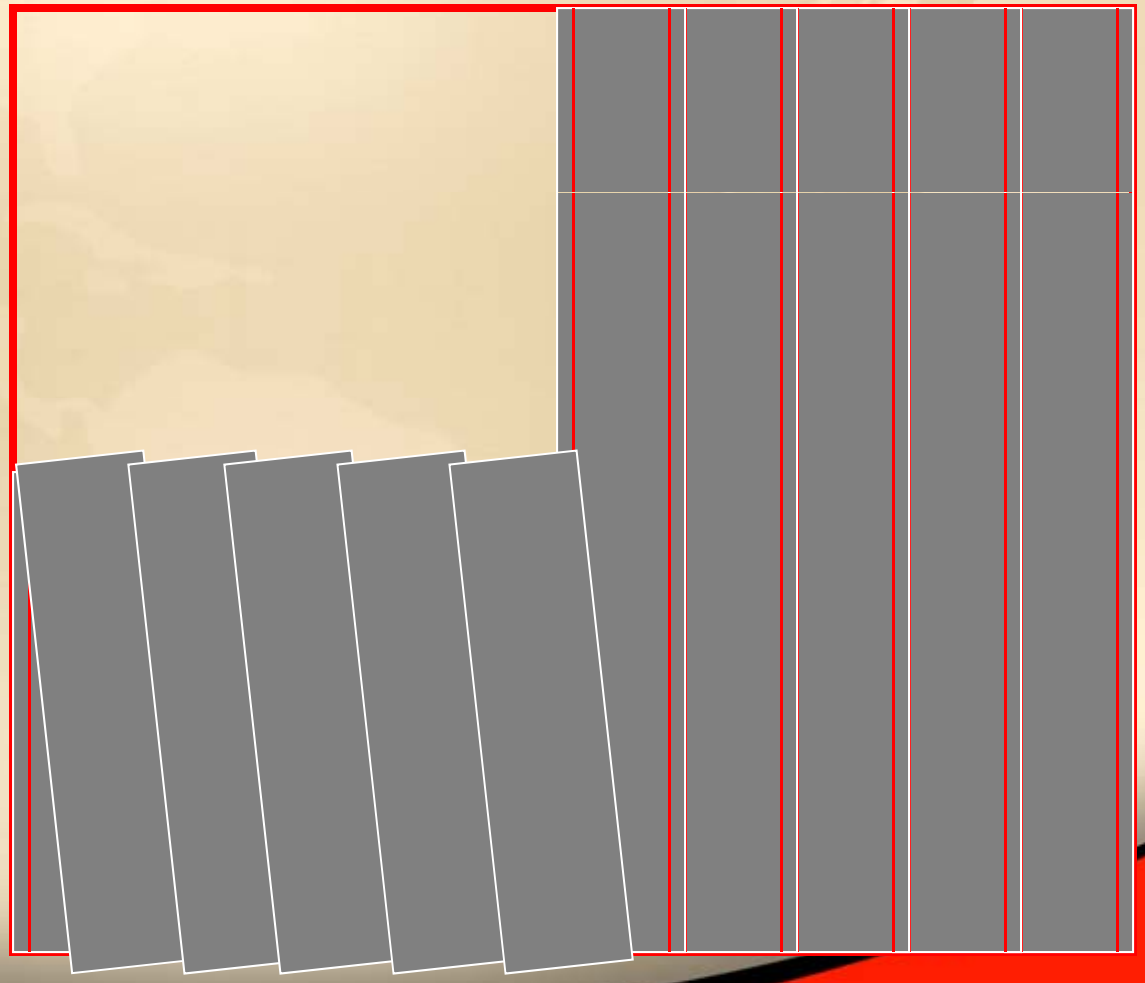


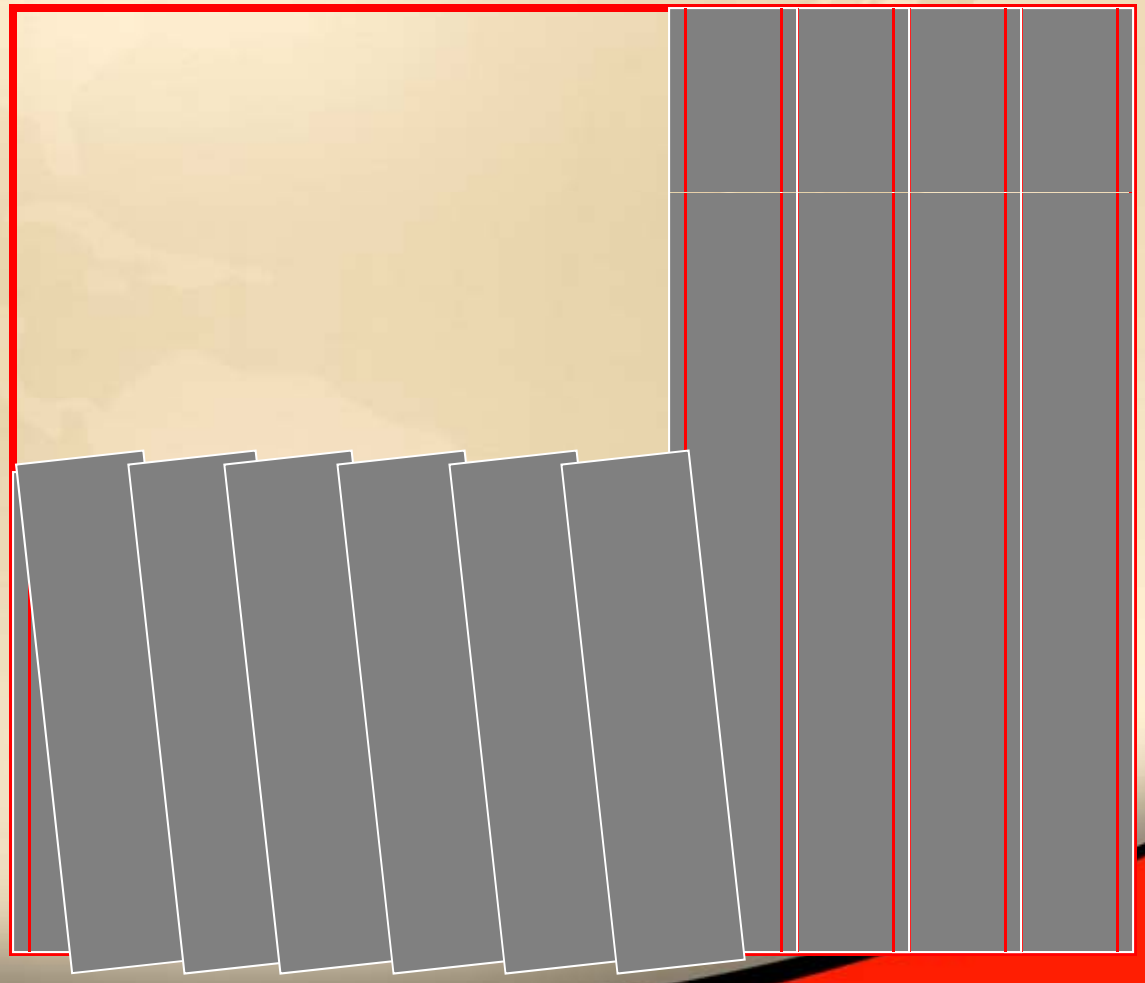
Fold back the second roll on itself

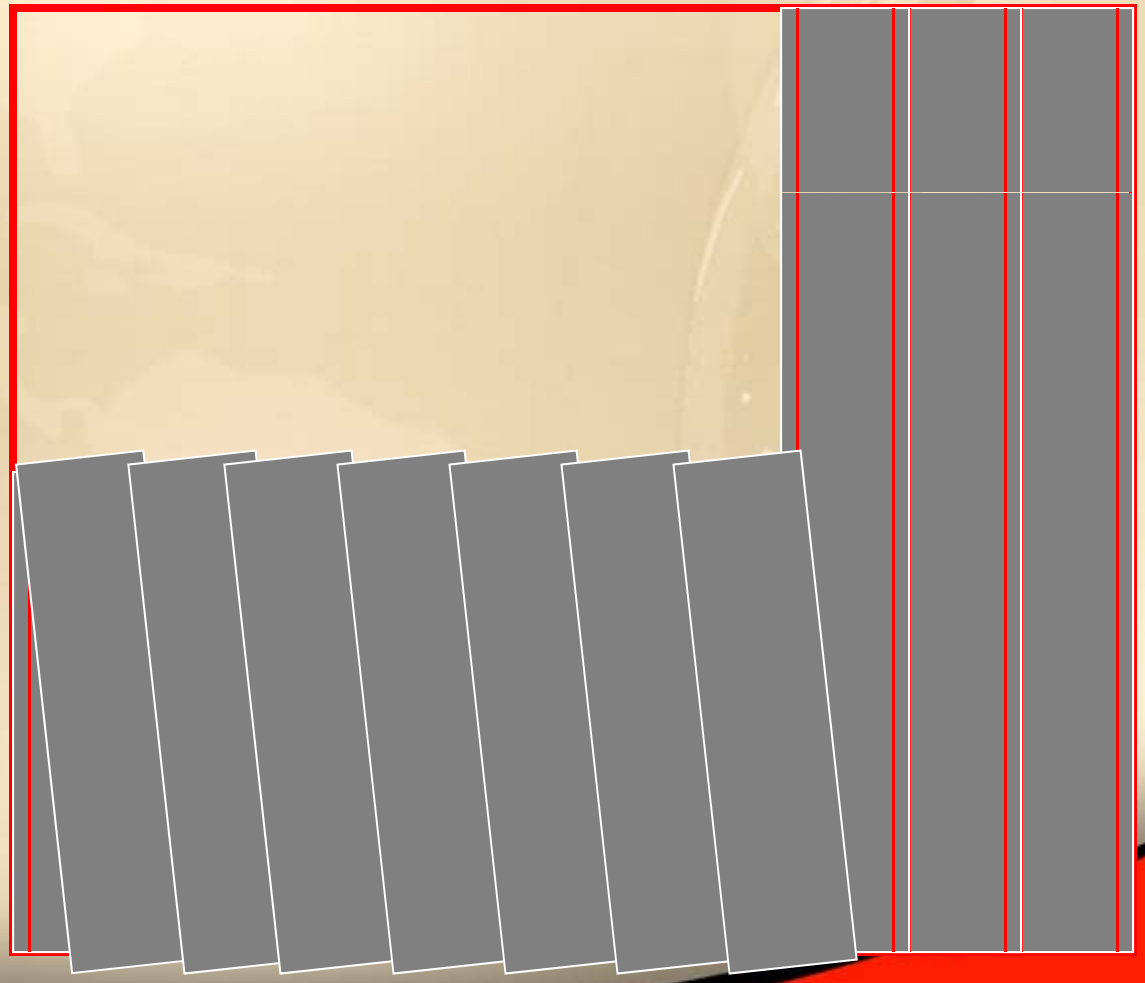


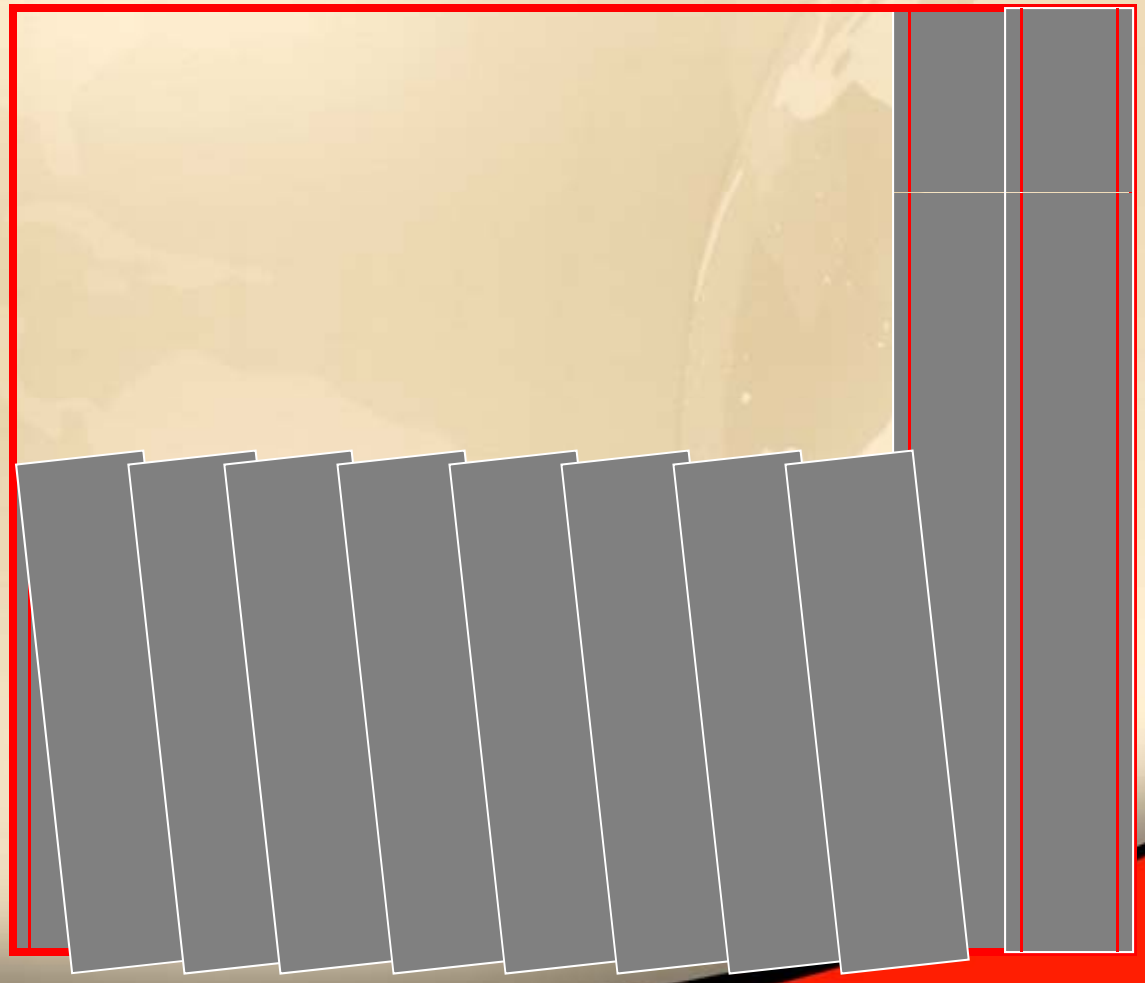


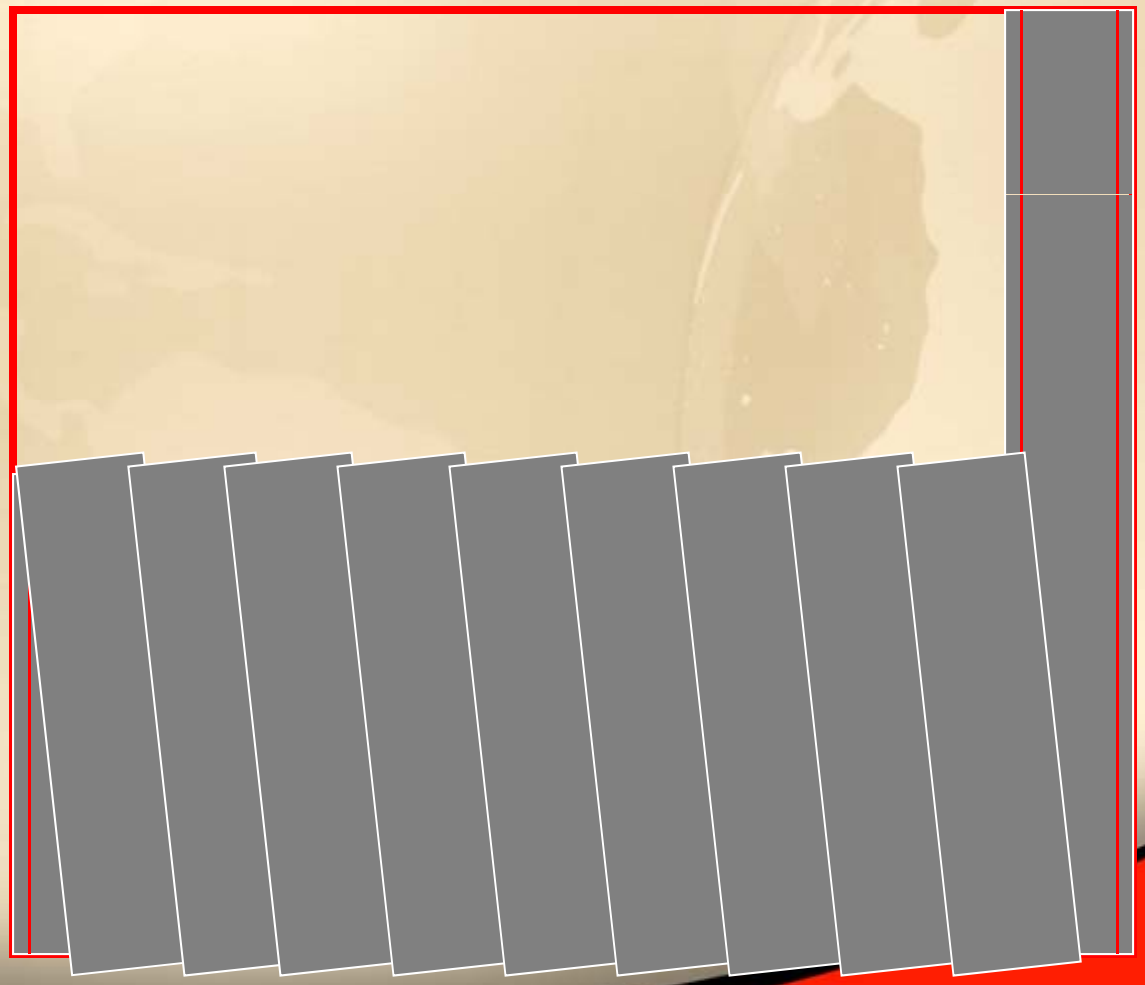


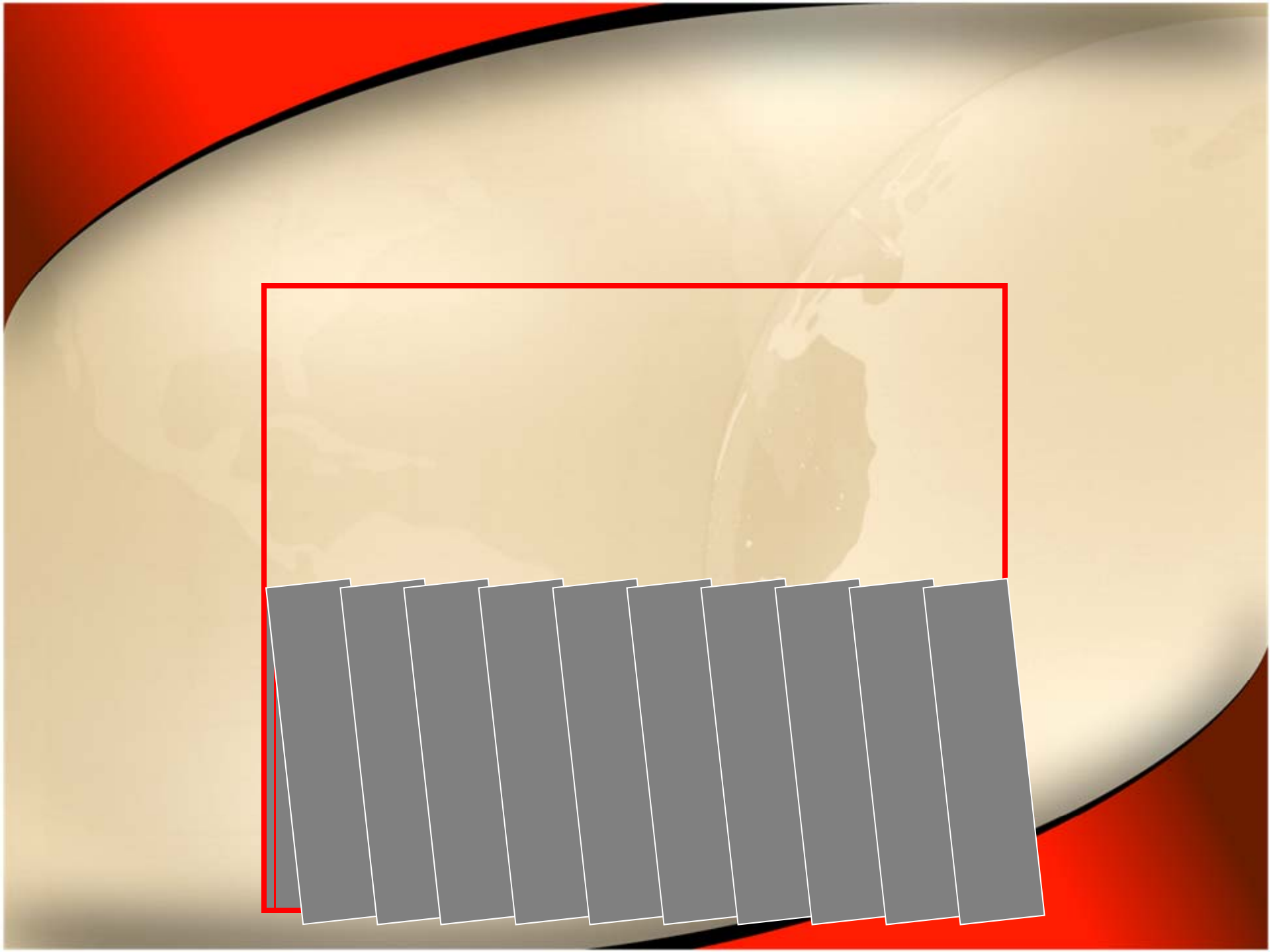




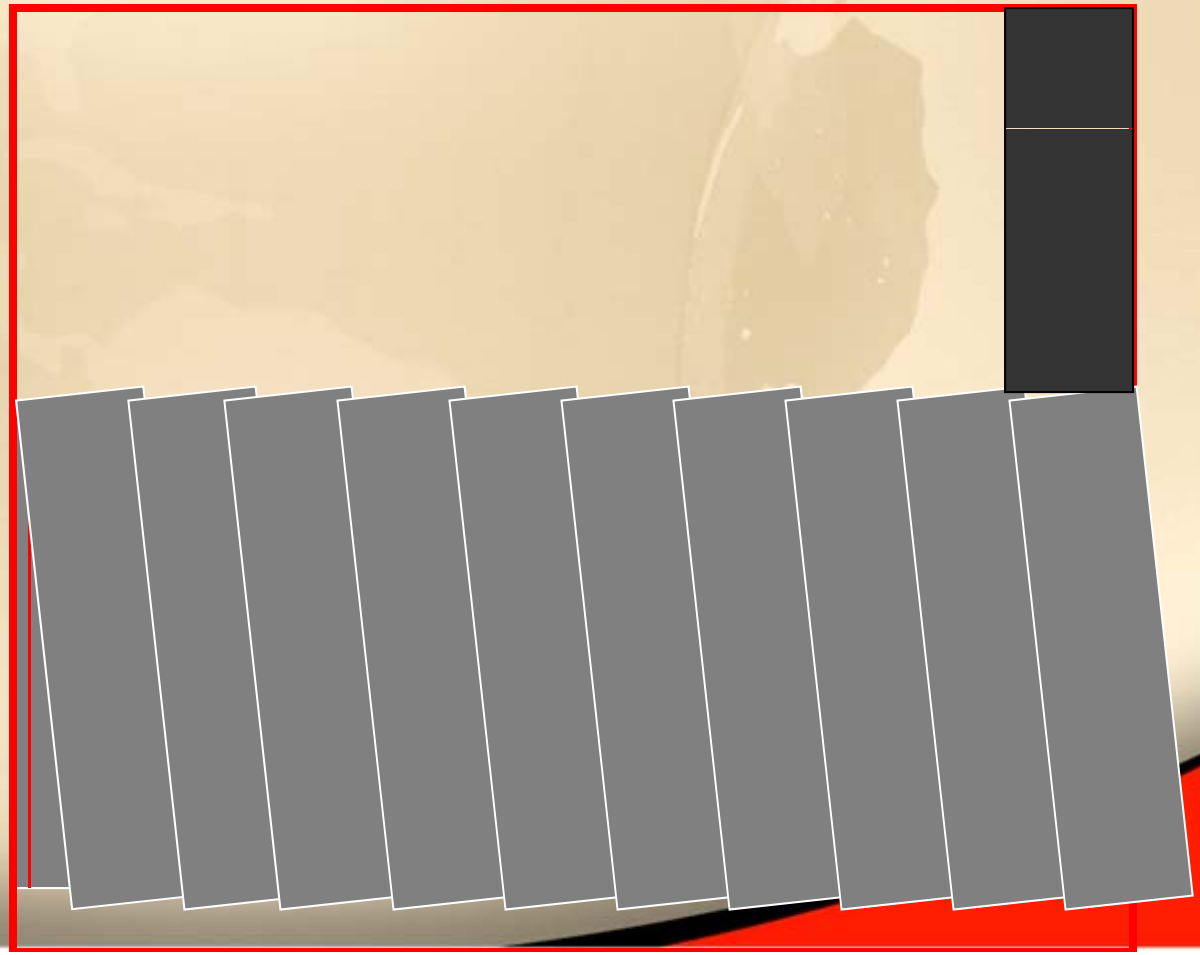


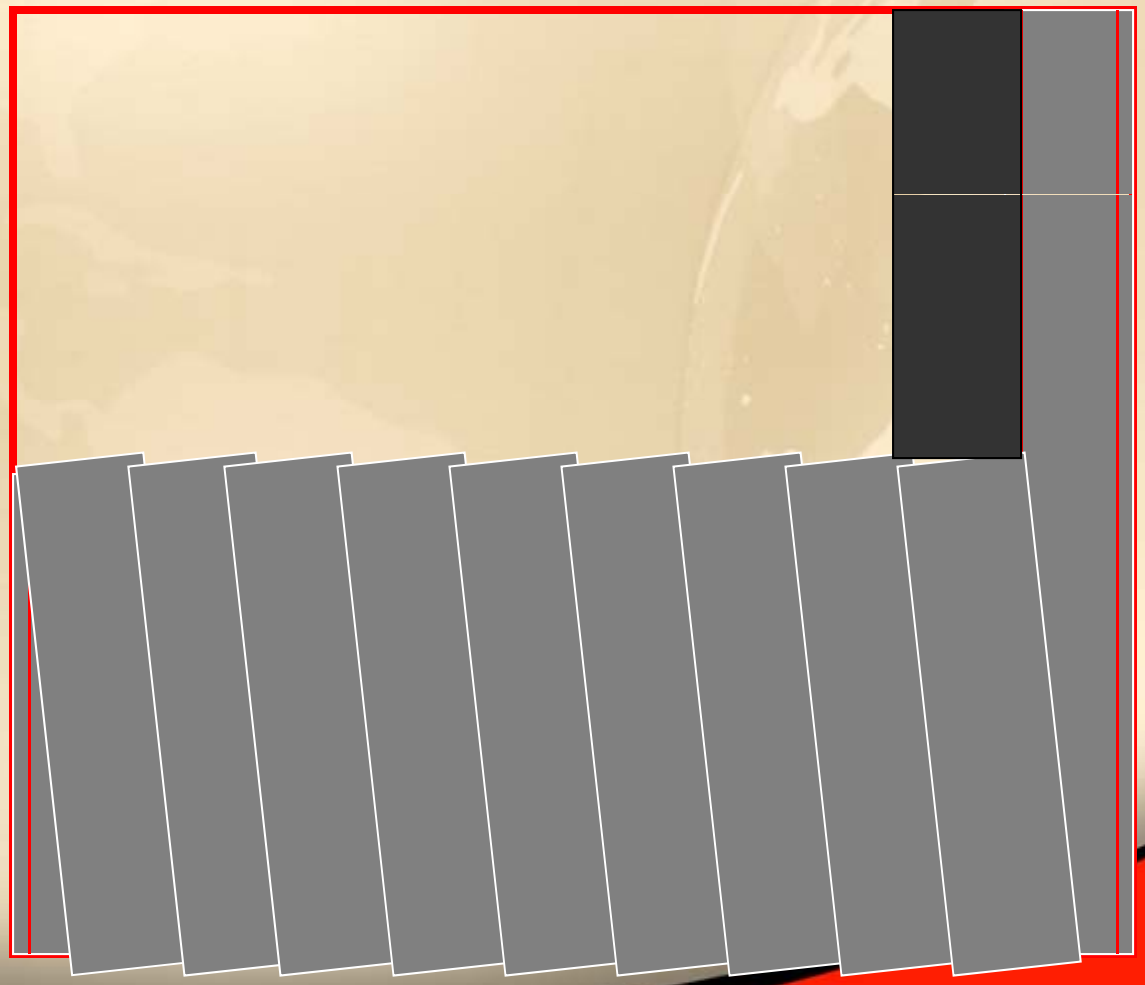


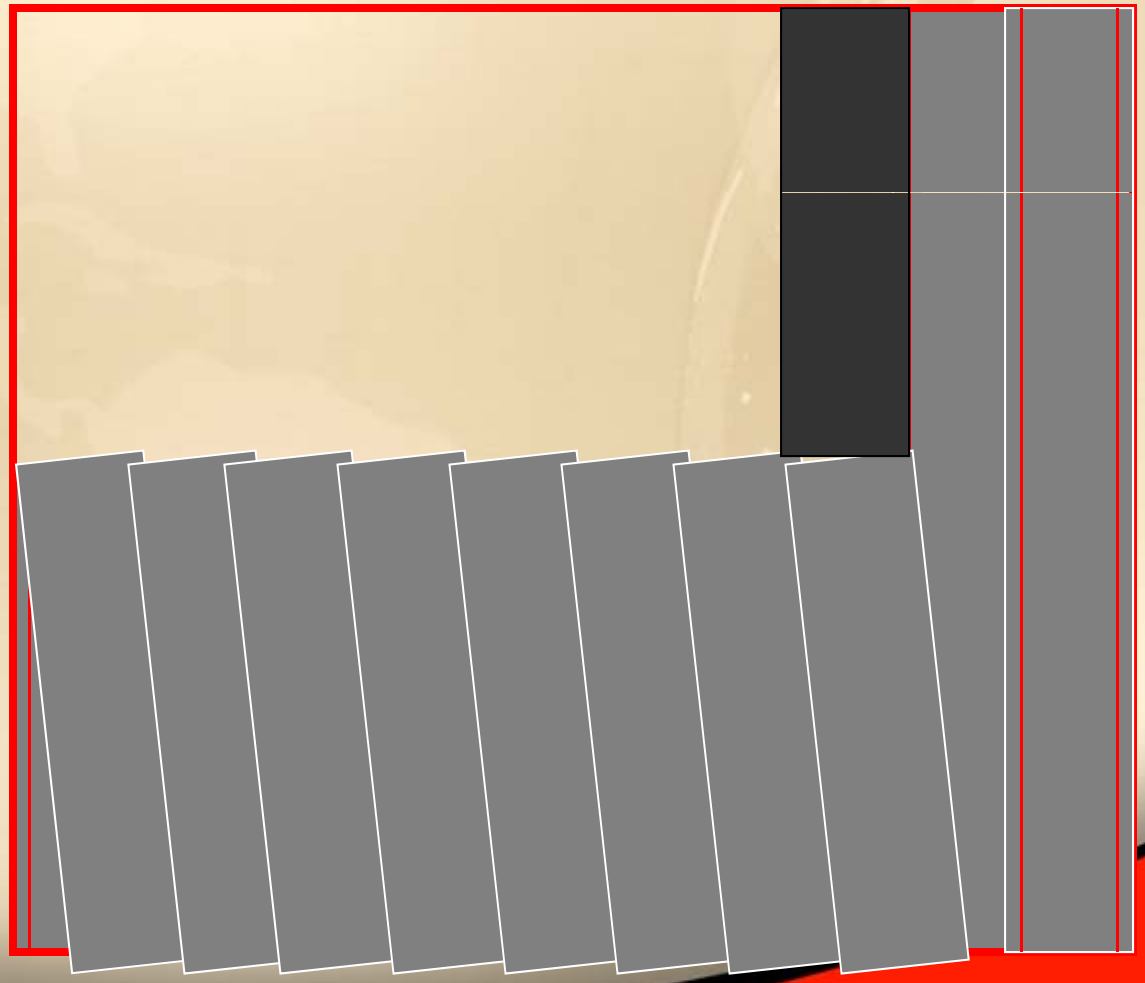




Spread the adhesive using a notched squeegee or spray at recommended rate







DO

DON’T GRANULES

LET THE ROLLS RELAX

FLASHING

SBS

Sheets may be installed in hot asphalt, Multi-Purpose MB Flashing Cement, or by heat welding Torch Grade sheets.

Flashing sections shall be of a size that will not allow cooling of adhesion asphalt before they can be placed into final position

Flashing must extend a minimum of 6” onto the field membrane

When torching to a granule surfaced sheet granules must be embedded before the lap is made.

APP

Flashing shall be installed in using APP Cool Membrane and Firestone Multi-Purpose MB Flashing Cement or APP Torch Grade products.

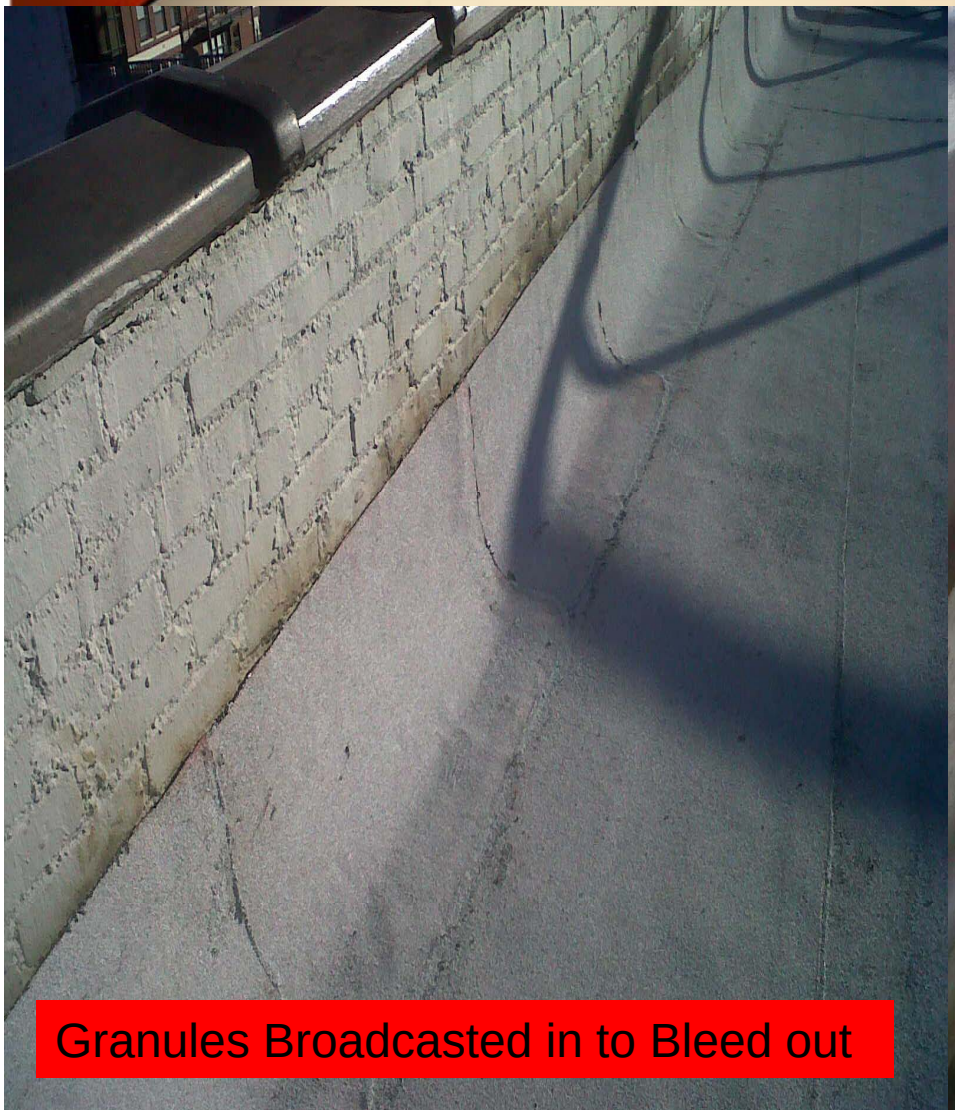
Flashing sections shall be of a size that will not allow cooling of adhesion asphalt before they can be placed into final position

Flashing must extend a minimum of 6” onto the field membrane

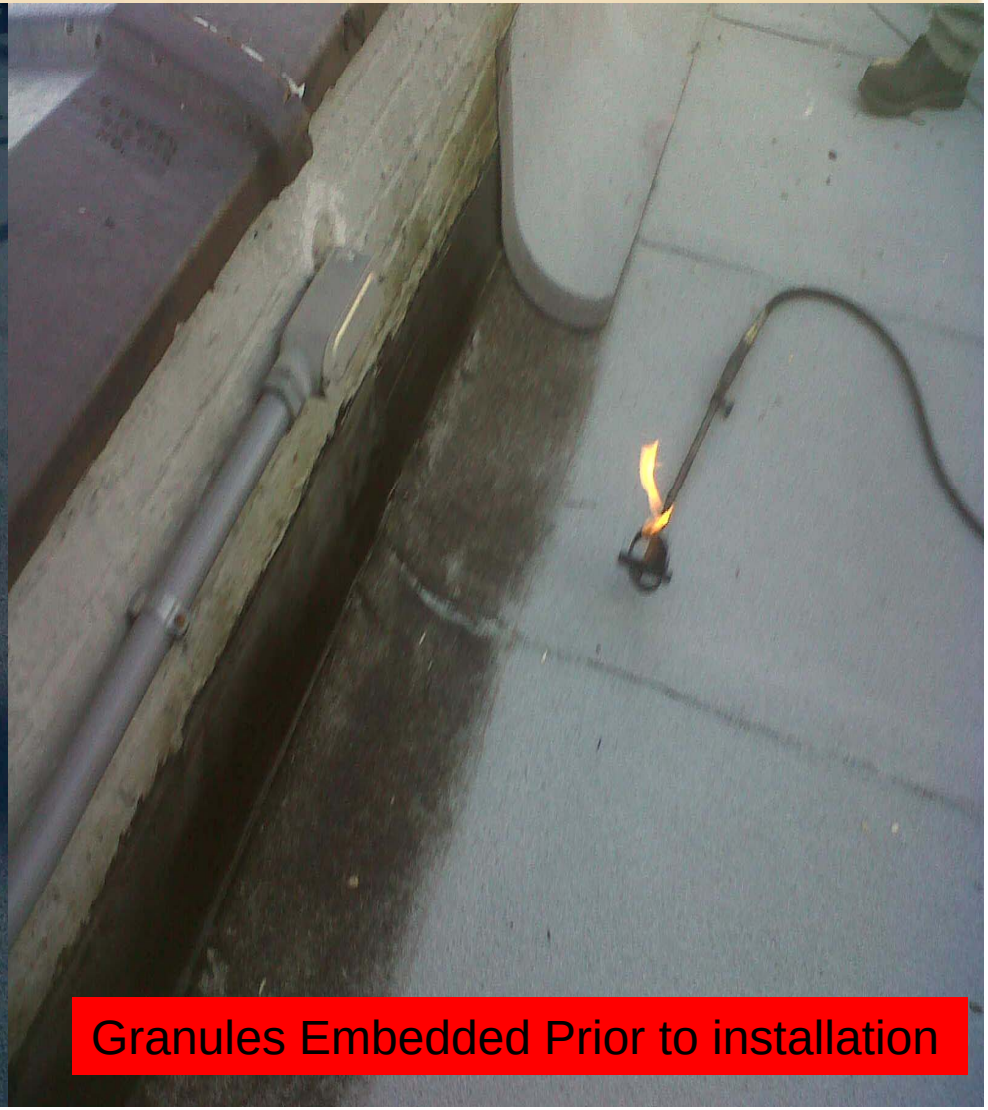
When torching to a granule surfaced sheet granules must be embedded before the lap is made.

SBS “hot” applied wall

Torch Applied Flashings



Granules Broadcasted in to Bleed out



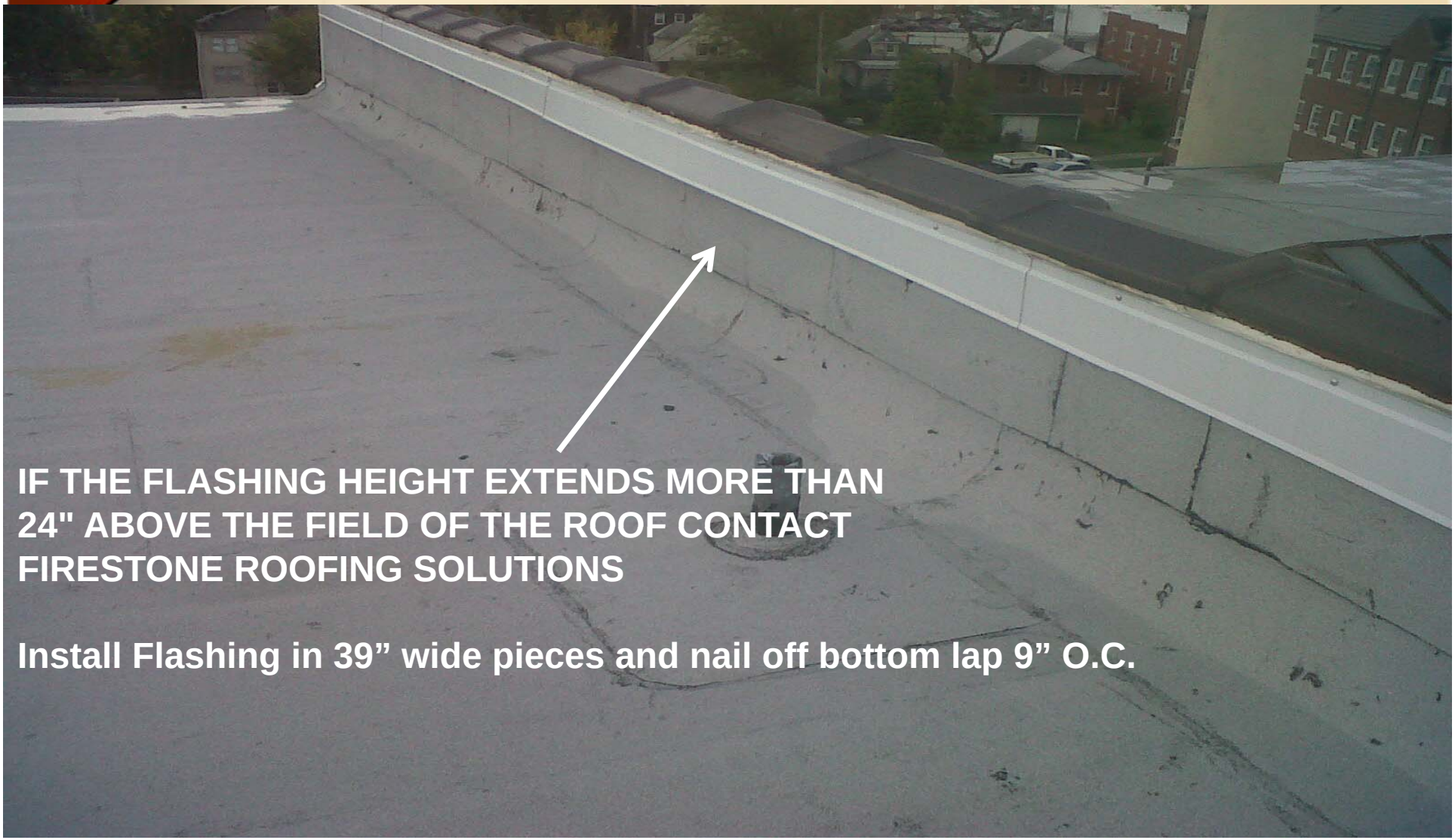
Granules Embedded Prior to installation

Firestone MB Flashing Cement

DO

Cold Adhesive Application DON'T

DON’T



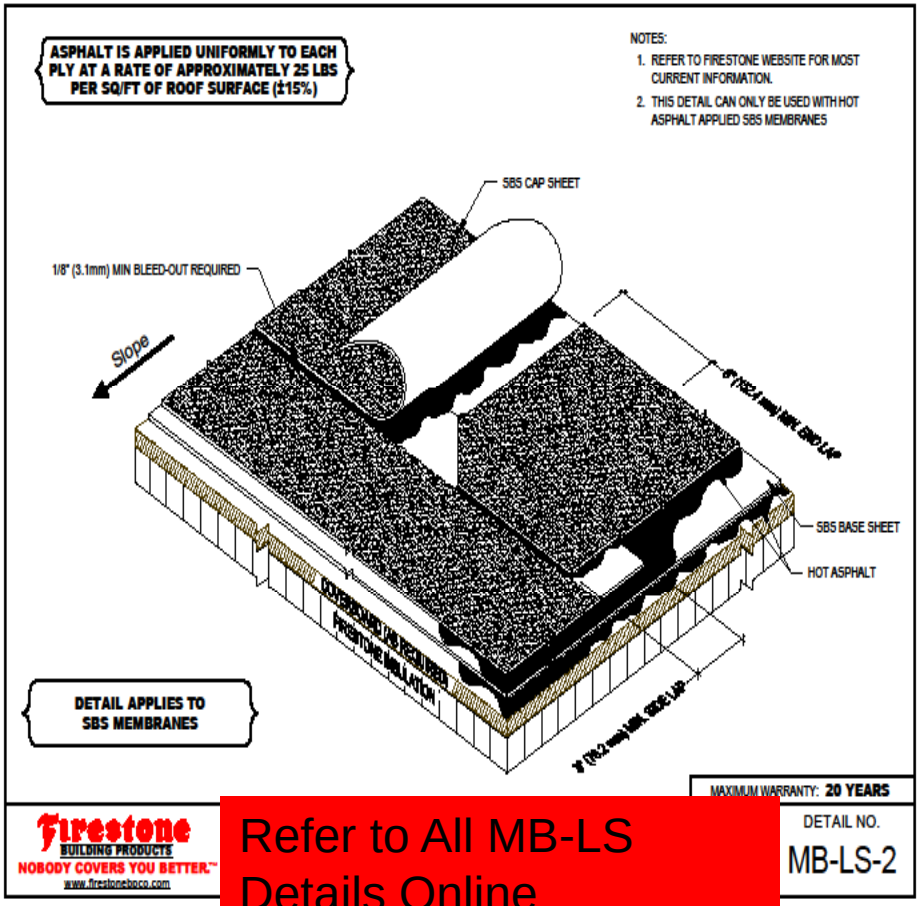
IF THE FLASHING HEIGHT EXTENDS MORE THAN 24" ABOVE THE FIELD OF THE ROOF CONTACT FIRESTONE ROOFING SOLUTIONS

Install Flashing in 39” wide pieces and nail off bottom lap 9” O.C.

DON’T

DON'T FORGET THE VERTICAL SEAMS

MB Lap Splice



Refer to All MB-LS Details Online

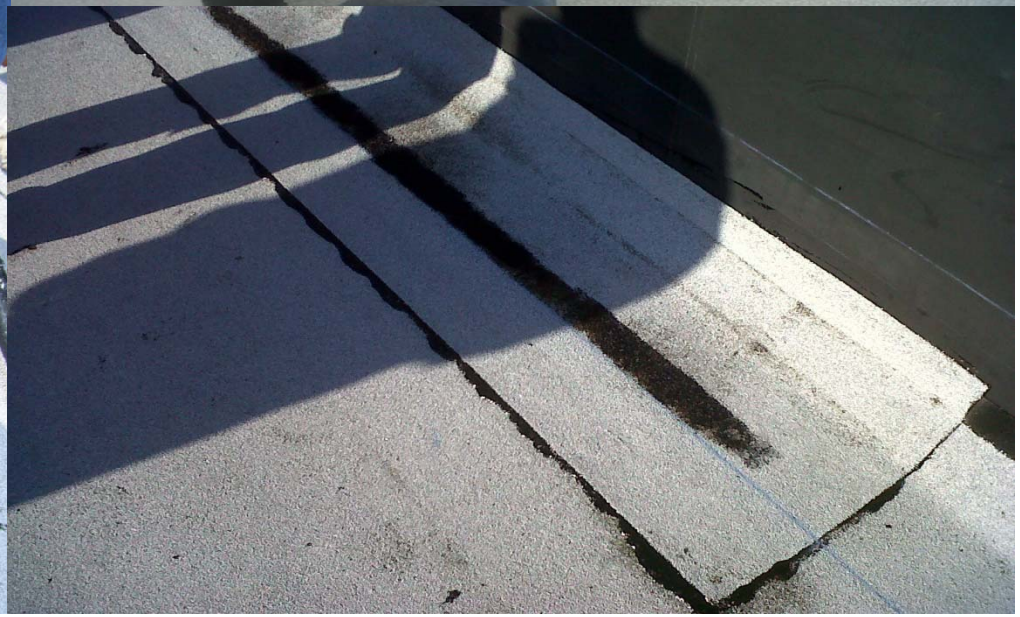
>Min 6” End Lap & 3” Side Lap

> Bottom Sheet Must Be Cut at A 45*

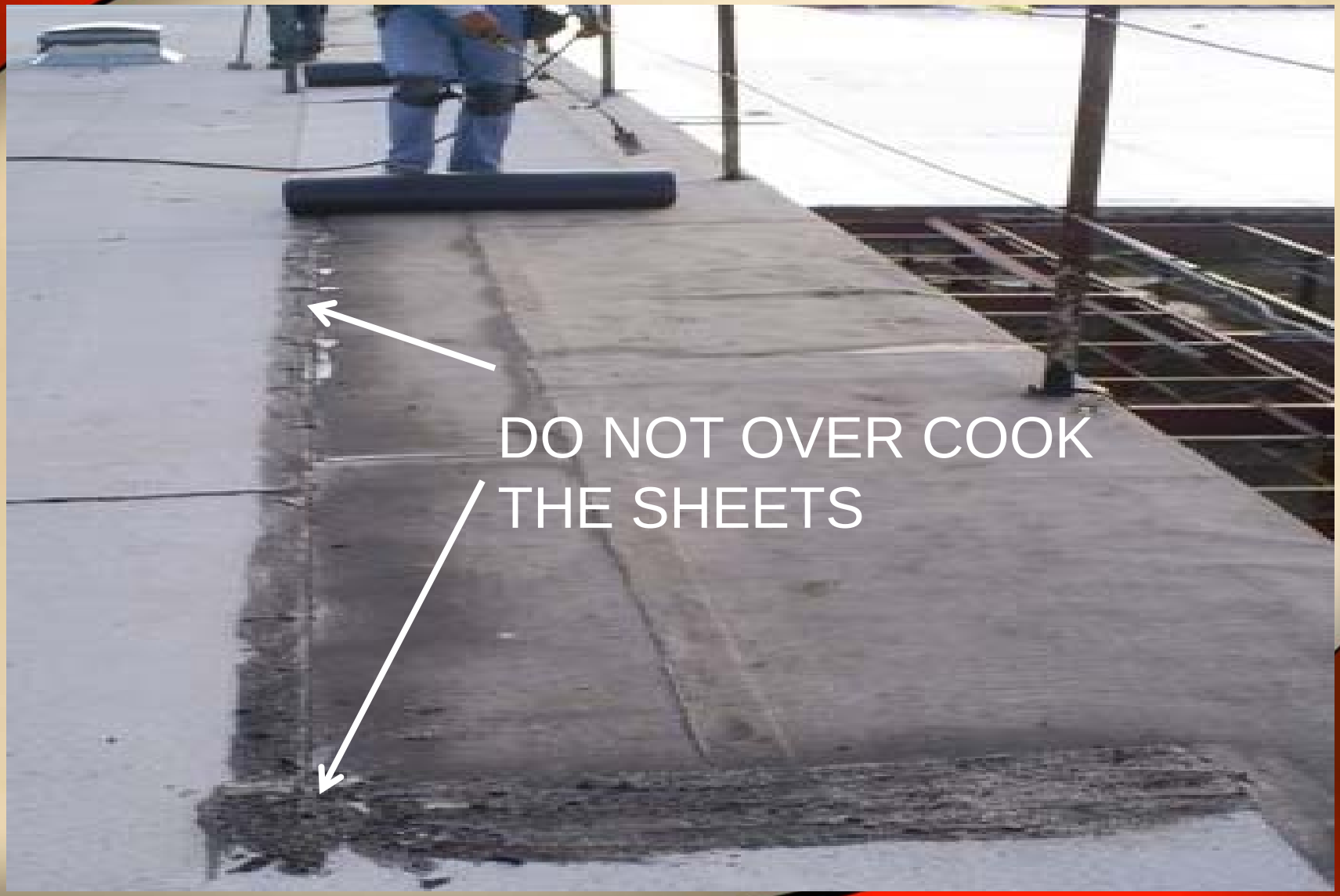
➢Granules Must Be Embedded When Heat Membrane (torch or hot air)

> MB Cold Adhesive/Flashing Cement can Only Be Use With APP Cool Or SBS

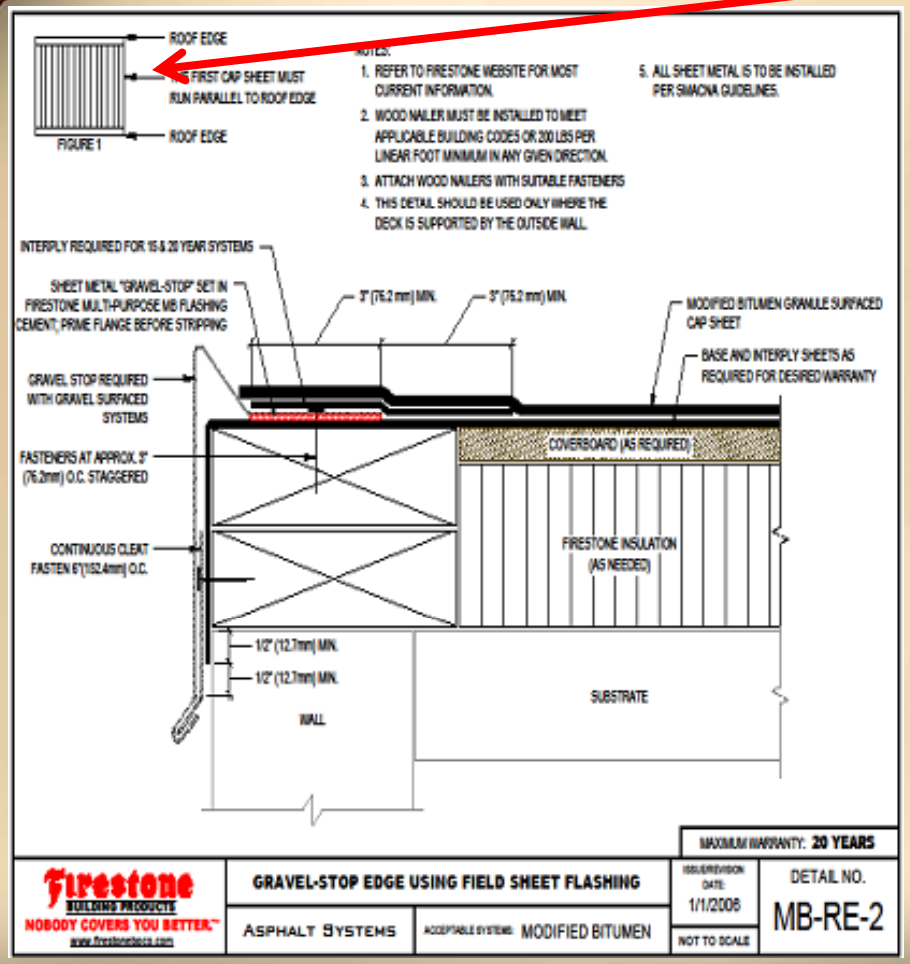
Heat Fused Seams



DON’T

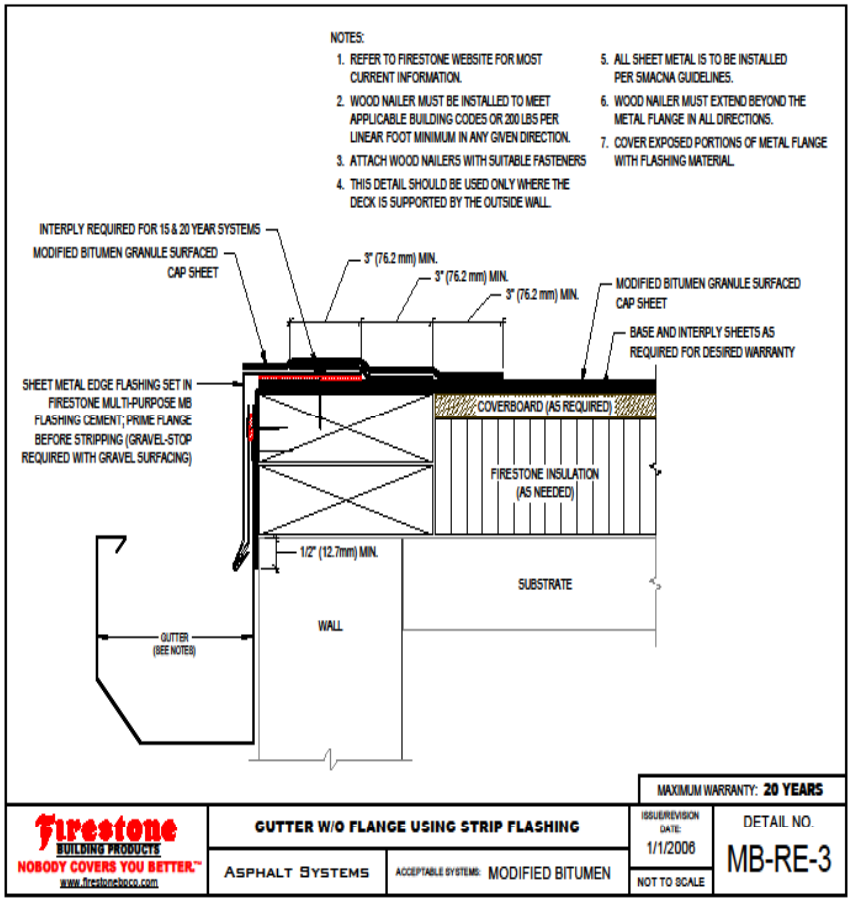


ROOF EDGE WITH FIELD SHEET



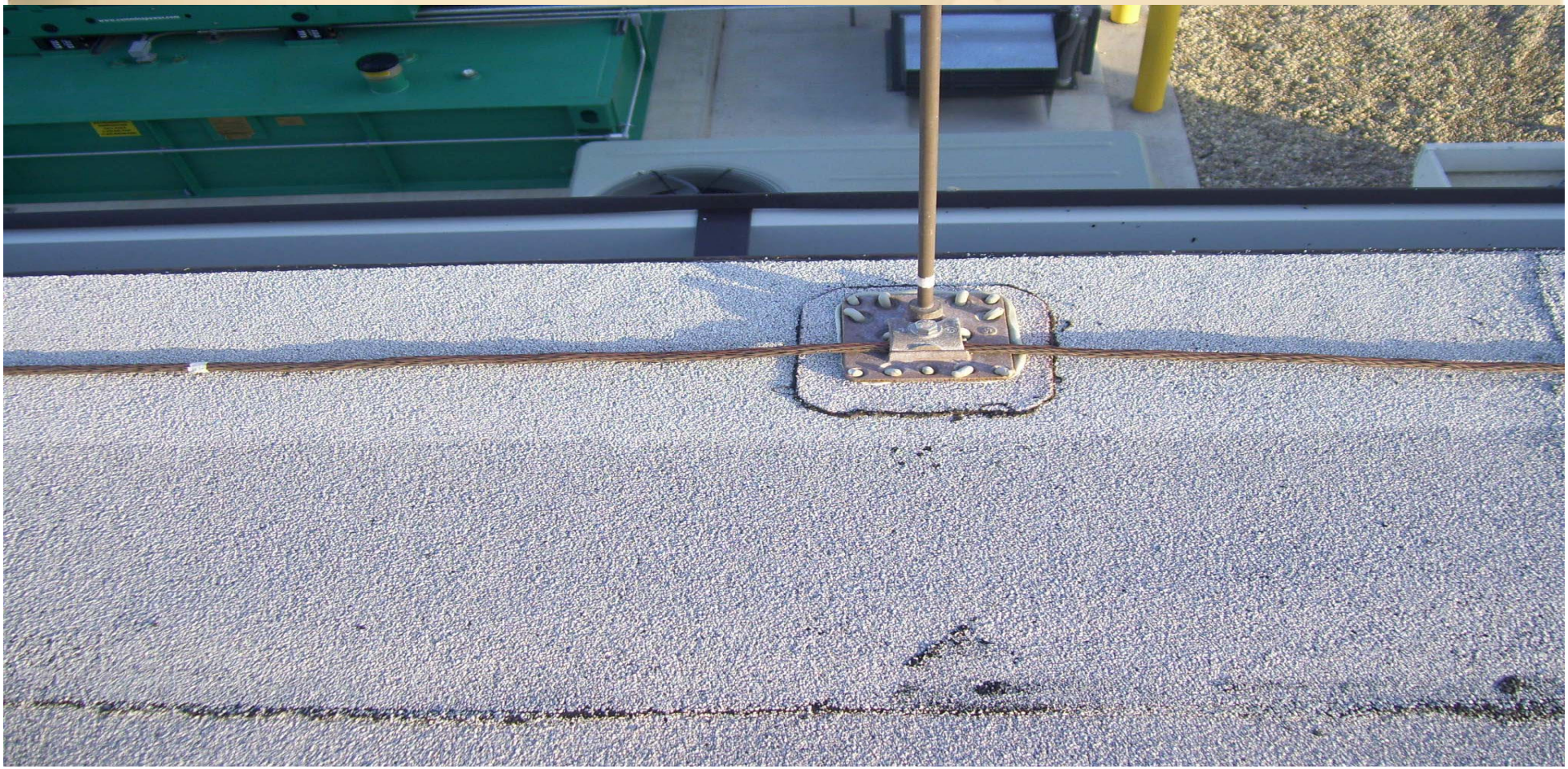
- **Header Sheet Must be Ran Around Perimeter**
- **ALL SHEET Metal is to be Installed PER Firestone or SMACNA Guidelines Whichever is More Stringent**
- **Metal Must Be Primed**
- **INTERPLY REQUIRED FOR 15 & 20 YEAR SYSTEMS**
- **Granules Must be Embedded If Torched or Heat Fused**
- **FASTENERS AT APPROX. 3“ O.C. STAGGERED**

MB-ROOF EDGE STRIP FLASHING



- **ALL SHEET Metal is to be installed per Firestone or SMACNA Guidelines; whichever is more stringent**
- **Metal Must Be Primed**
- **INTERPLY REQUIRED FOR 15 & 20 YEAR SYSTEMS**
- **Granules Must be Embedded If Torched or Heat Fused**
- **FASTENERS AT APPROX. 3“ O.C. STAGGERED**

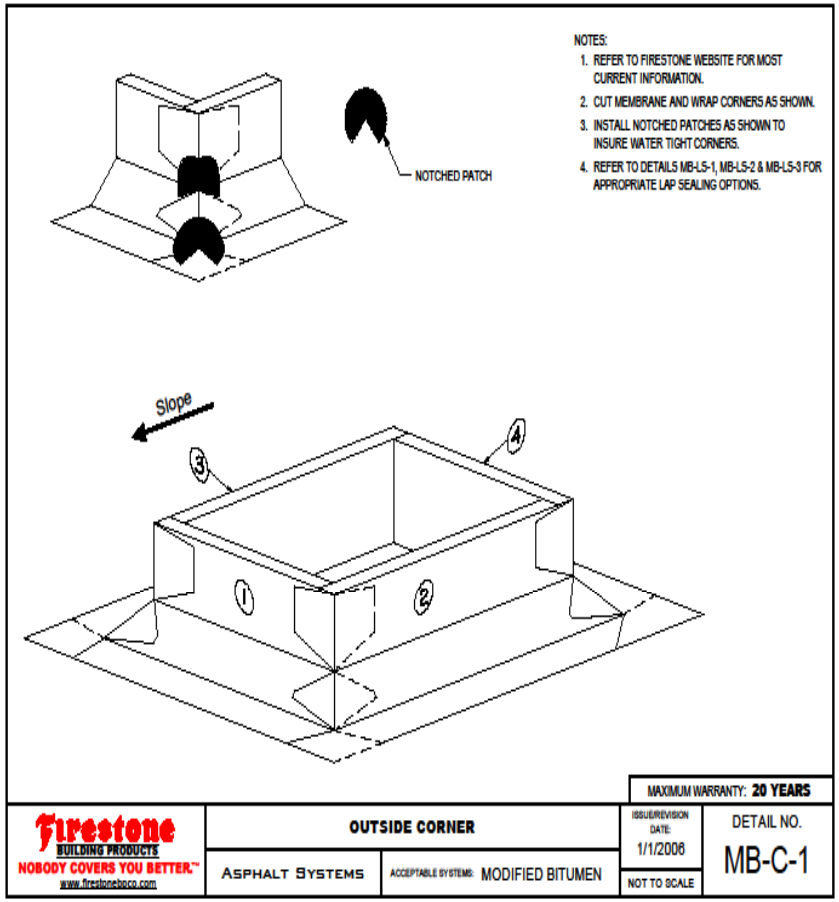
DO



DON’T

- NO INTER-PLY
- GRANULES NOT EMBEDDED

MB-C-1



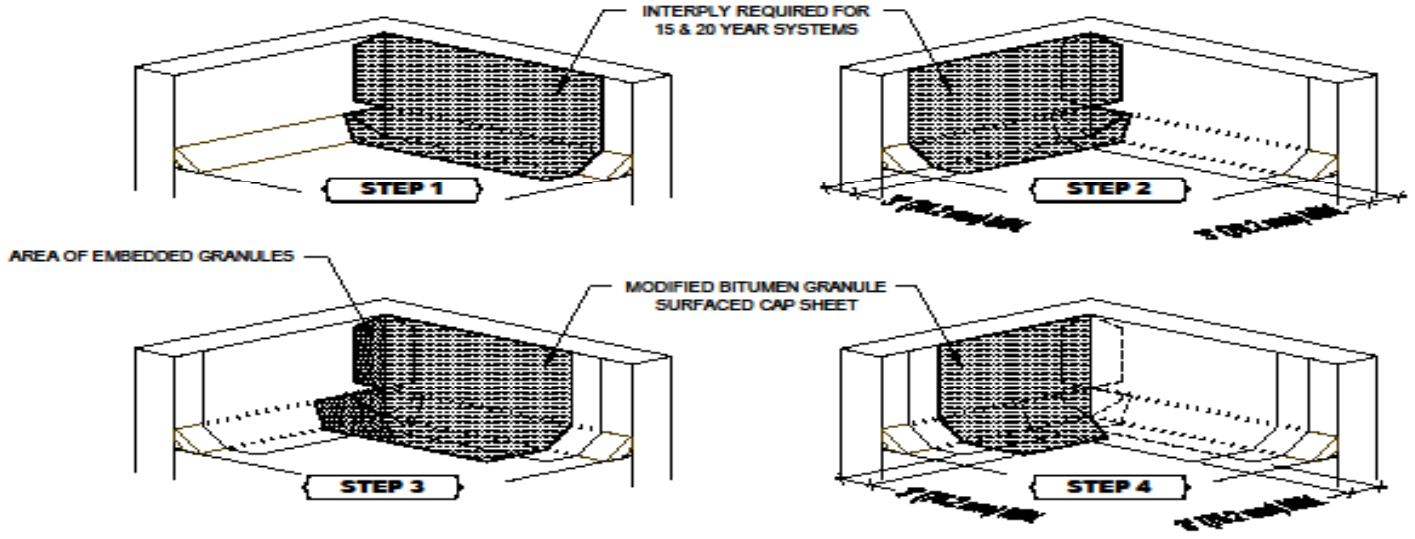
- Can Be Installed With
  - Hot Asphalt
  - Torched (embed granules)
  - Hot Air (embed granules)
  - MB Flashing Cement
  - ULTRA-FLASH

DO

DON’T

MB-C-2

NOTES:
1. REFER TO FIRESTONE WEBSITE FOR MOST CURRENT INFORMATION.
2. REFER TO DETAILS MB-LS-1, MB-LS-2 & MB-LS-3 FOR APPROPRIATE LAP SEALING OPTIONS.



MAXIMUM WARRANTY: **20 YEARS**

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INSIDE CORNER

ASPHALT SYSTEMS

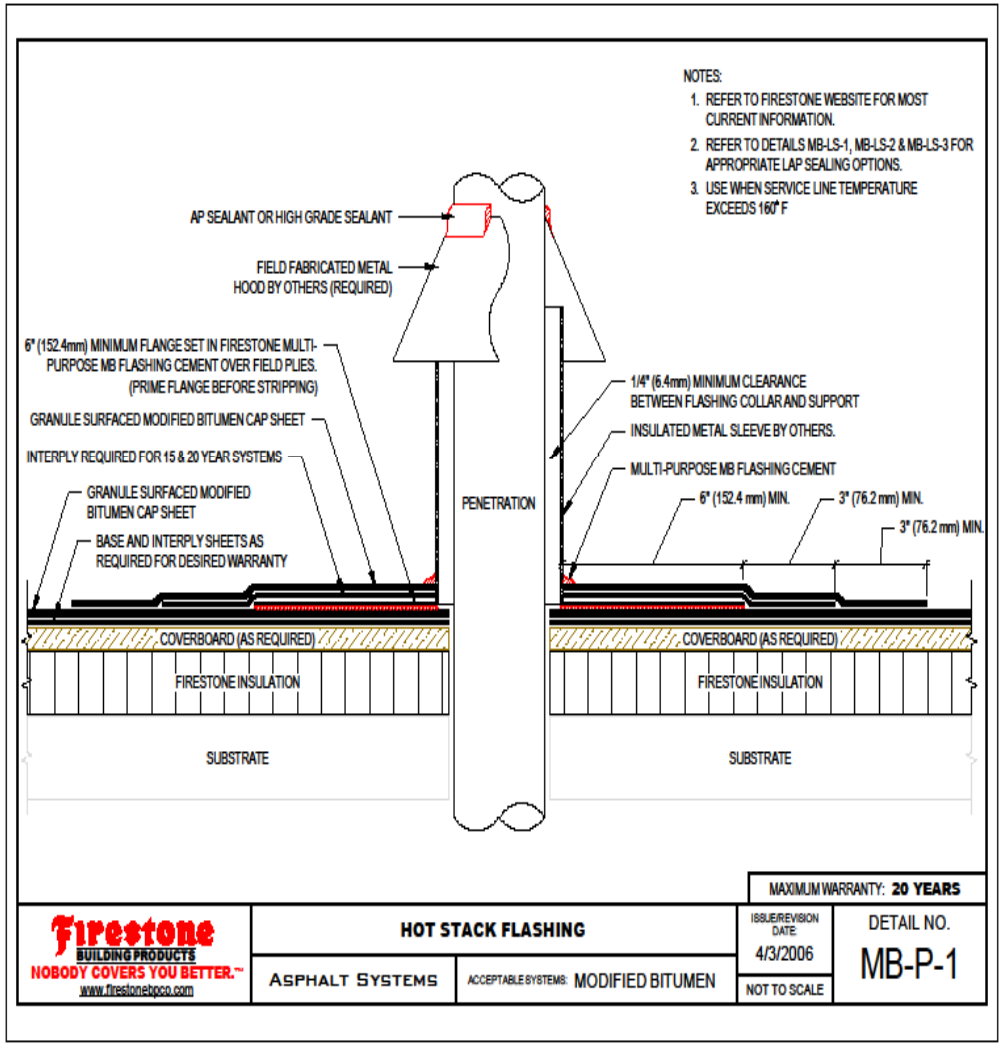
ACCEPTABLE SYSTEMS: MODIFIED BITUMEN

ISSUE/REVISION DATE: 1/1/2006

NOT TO SCALE

DETAIL NO. MB-C-2

MB-P-1



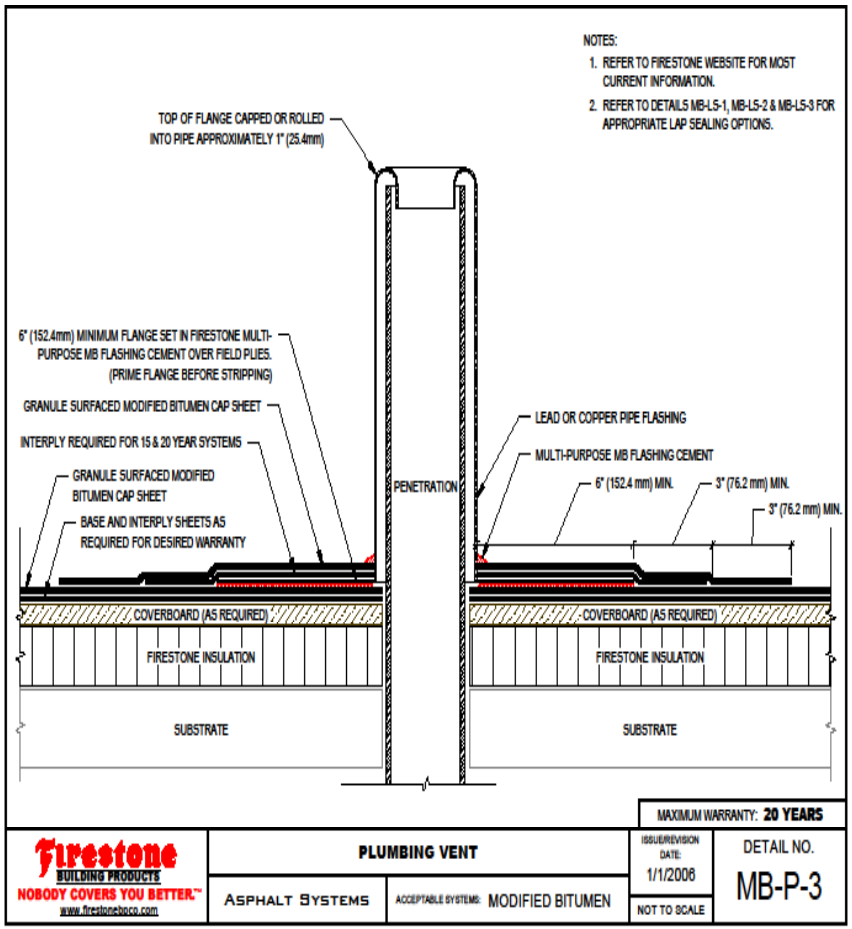
- Metal Must Be Primed
- INTER-PLY REQUIRED FOR 15 & 20 YEAR WARRANTIES
- Granules Must be Embedded If Torched or Heat Fused

DO

DON’T

DON’T

MB-P-2



- Metal Must Be Primed
- INTER-PLY REQUIRED FOR 15 & 20 YEAR WARRANTIES
- Granules Must be Embedded If Torched or Heat Fused

DO

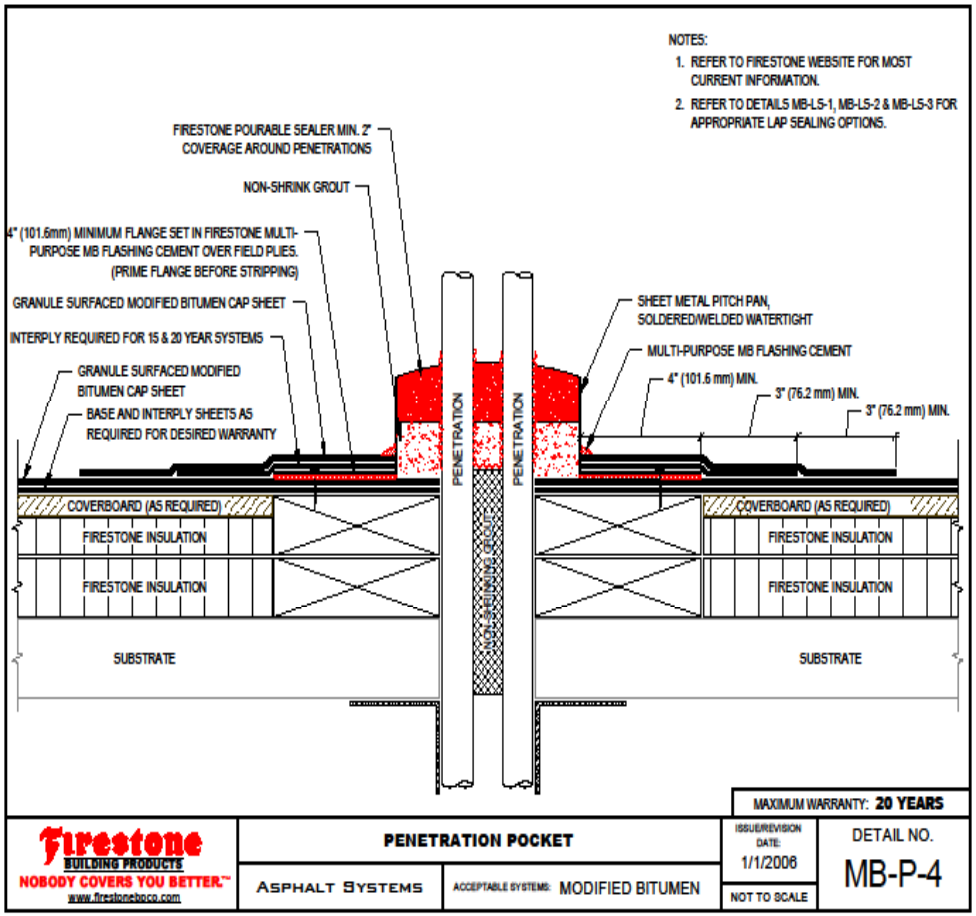
- Can Be Installed With
  - Hot Asphalt
  - Torched (embed granules)
  - Hot Air (embed granules)
  - MB Flashing Cement
  - ULTRA-FLASH

DON’T

Missing inter-ply and target

DON’T

PENETRATION POCKET



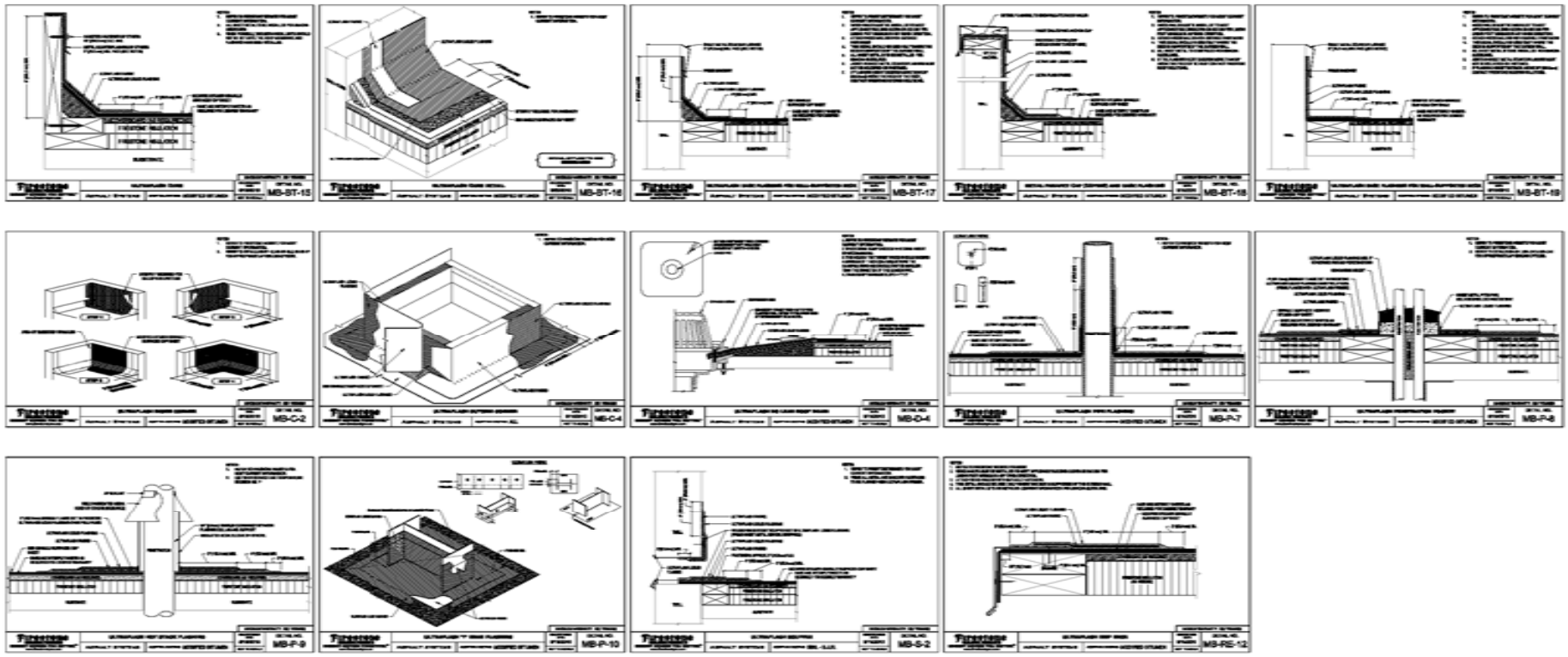
- Metal Must Be Primed
- INTER-PLY REQUIRED FOR 15 & 20 YEAR WARRANTIES
- Granules Must be Embedded If Torched or Heat Fused

DO

DON’T

DON’T & DON’T

UltraFlash Detail Poster



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UltraFlash™

ASPHALT SYSTEMS

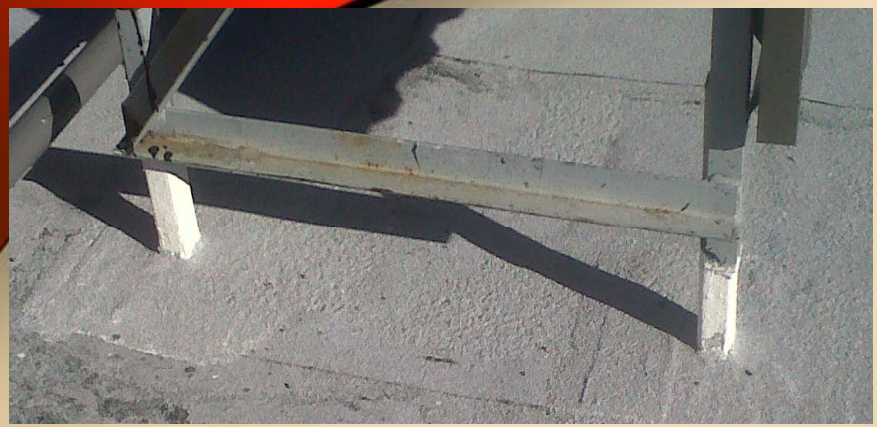
ACCEPTABLE SYSTEMS: MODIFIED BITUMEN & BUR

ISSUE/REVISION DATE: 8/20/2010

NOT TO SCALE

DETAIL NO. UF

UltraFlash Penetration



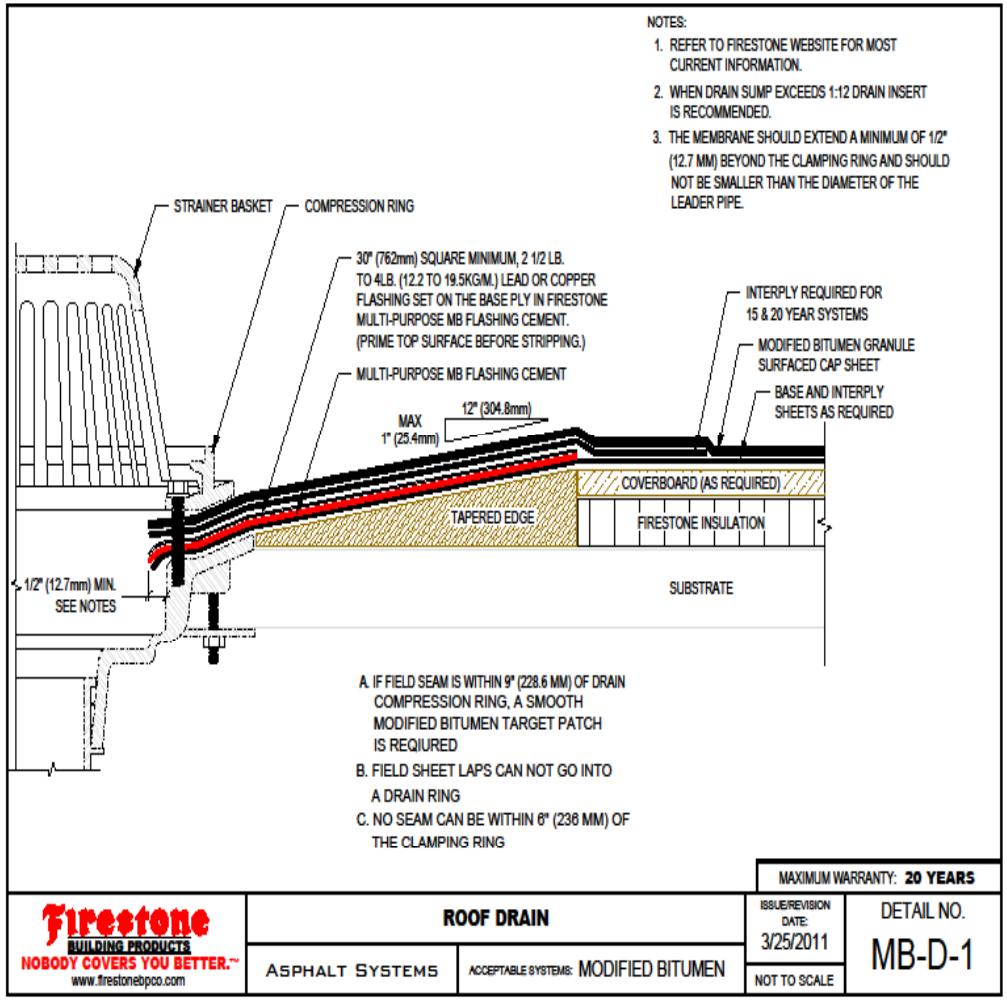
Paint With PC100

Or Broadcast Granules

In to the Liquid Flashing

Square Pipes
Outside Corners
Drains
I-Beams
Scuppers
Pipes
Penetration Pockets
And more

Drain Detail

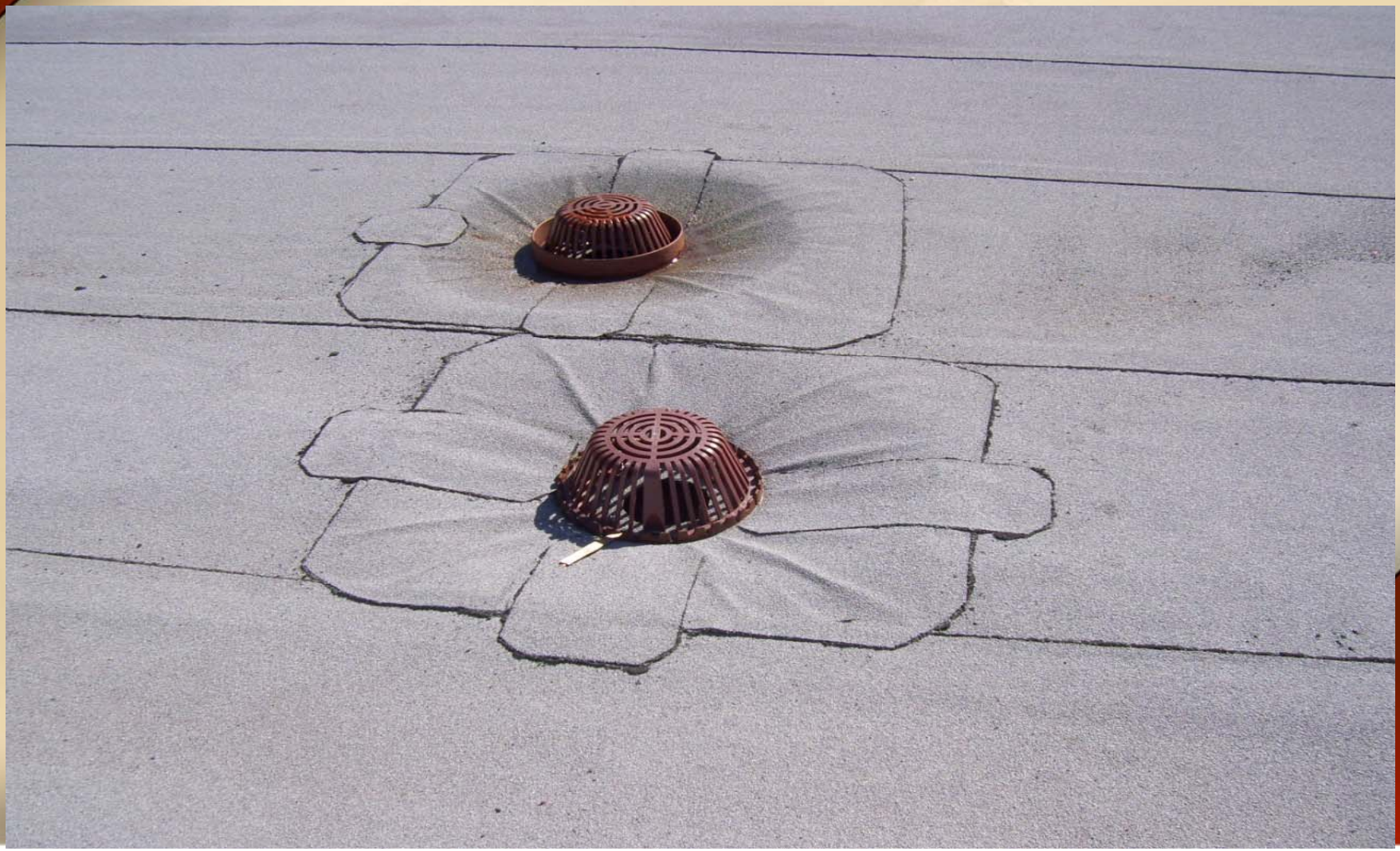


- 30" SQUARE MINIMUM, 2 1/2 LB. TO 4LB. LEAD OR COPPER
- FLASHING SET ON THE BASE PLY IN FIRESTONE MULTI-PURPOSE MB FLASHING CEMENT.
- (PRIME TOP SURFACE BEFORE STRIPPING.)
- FIELD SHEET LAPS CAN NOT GO INTO A DRAIN RING
- NO SEAM CAN BE WITHIN 6" OF THE CLAMPING RING
- IF FIELD SEAM IS WITHIN 9" OF DRAIN
- COMPRESSION RING, A SMOOTH MODIFIED BITUMEN TARGET PATCH IS REQUIRED
- INTERPLY REQUIRED FOR 15 & 20 YEAR SYSTEMS

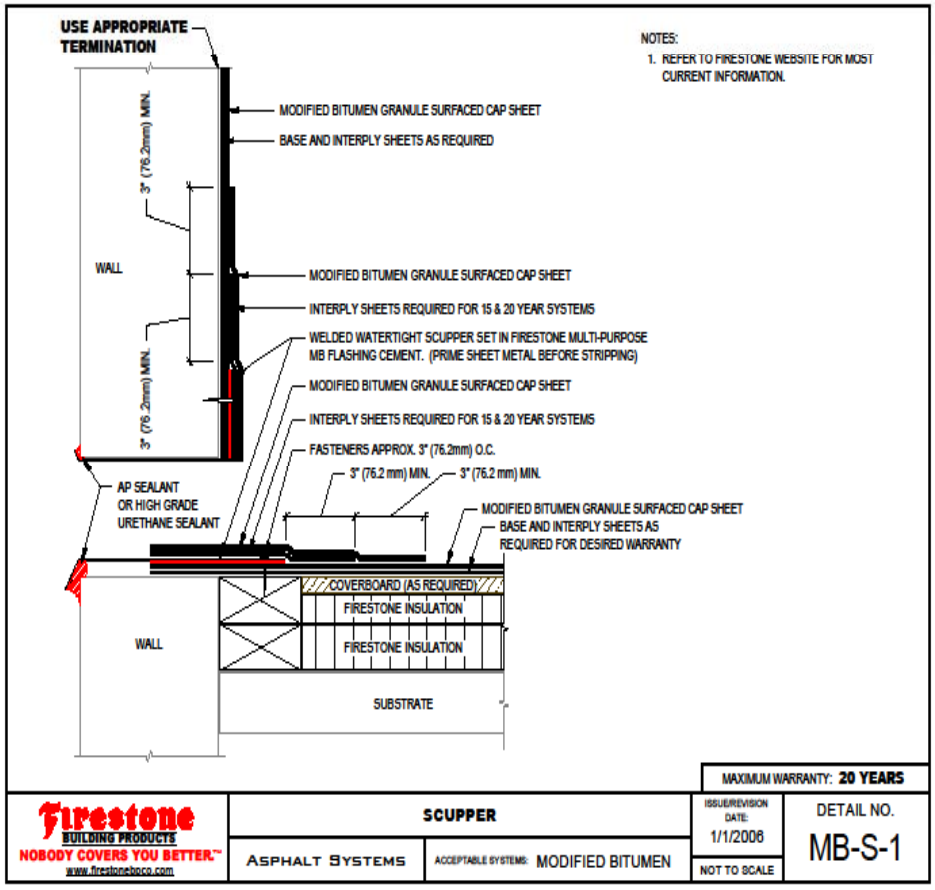
DO

DONT

DON’T

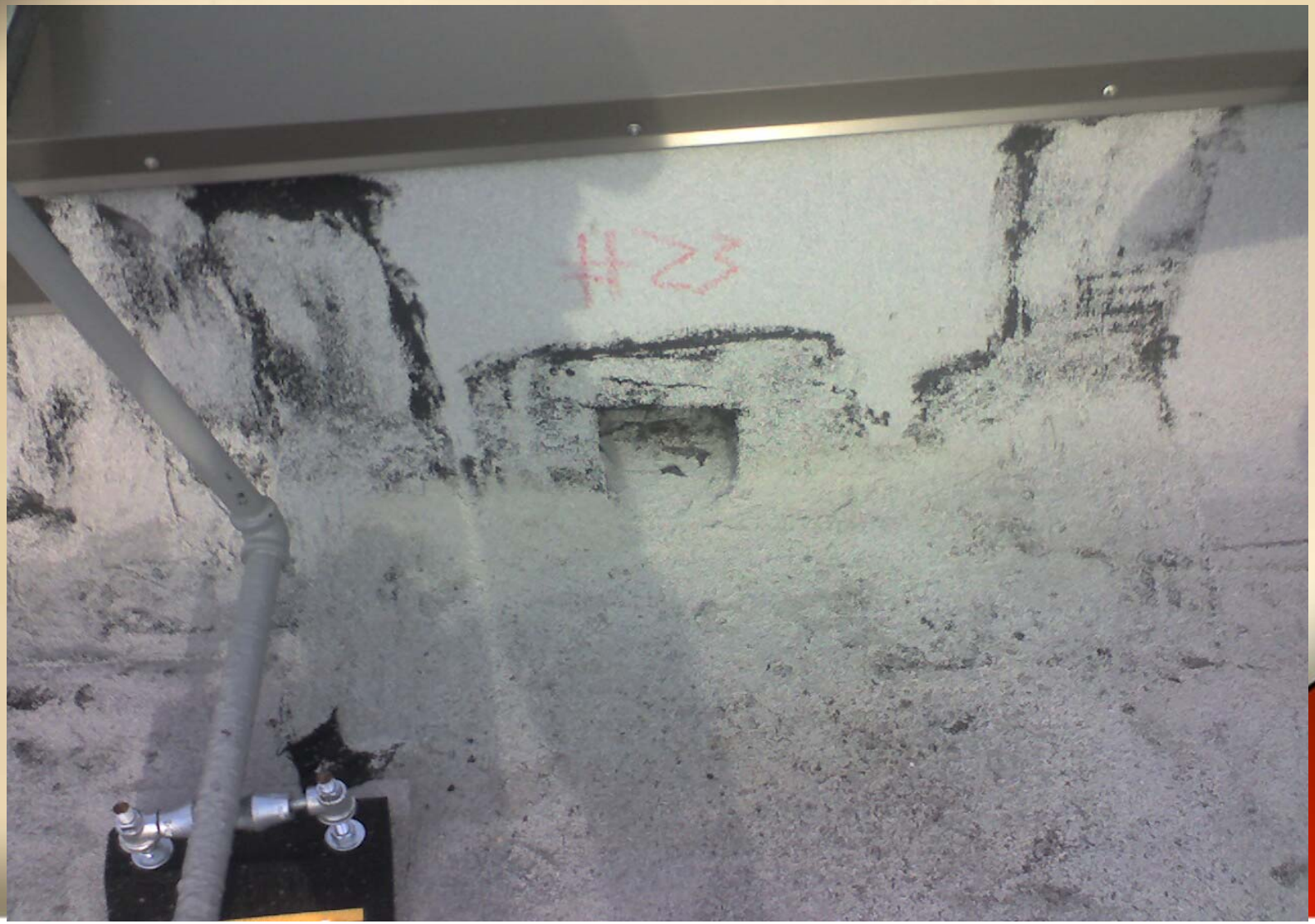


SCUPPER



- **ALL SHEET Metal is to be Installed per Firestone or SMACNA Guidelines; whichever is more stringent**
- **Metal Must Be Primed**
- **INTERPLY REQUIRED FOR 15 & 20 YEAR SYSTEMS**
- **Granules Must be Embedded If Torched or Heat Fused**
- **FASTENERS AT APPROX. 3“ O.C. STAGGERED**

DON’T



DON’T


Scupper flange not installed on top of wall flashing
Metal not primed

ALL T-BAR MUST BE COVERED WITH COUNTERFLASHING

SA Basics

1. **Starting at the low point of the roof, unroll Firestone MB Base SA and allow the sheet to relax**

2. **Begin the attachment by removing the first half of the release paper backing from the membrane.**

3. Apply pressure to the top side of the exposed area, starting at the center and working out to the edges, to ensure continuous attachment to the substrate

3. Remove the remaining release-backing from the Firestone SA Base, keeping the membrane in contact with substrate and applying continuous pressure to the top of the sheet, from the center out to the edges.

5. Align subsequent rolls, shingling the laps, and maintaining a minimum 3" side lap and a minimum 6" end lap and repeat the application

6. Note: Firestone MB Base SA Roofing Systems require a heat fused (torched) cap sheet or insulation adhered in I.S.O. Twin Pack.

Self Adhered

LiquiGard™

Firestone Building Products

LiquiGard™

About

- Firestone LiquiGard™ is a tough, ***liquid applied***, two-part polyurethane adhesive. It forms a superior bond with approved Firestone insulation and with **SBS** and **BUR** products.
- Great for bonding multiple layers of membrane and approved Firestone insulation.
- **No Odor** and **Zero VOC's** makes it great for use on schools, hospitals, and occupied buildings.
- LiquiGard™ *Part B* activator is an *amber colored* liquid component which initiates a chemical cure when blended with LiquiGard™ Part A. This is not a catalyst and must be mixed in **proper ratios**.
- For use with Firestone SBS Modified Bitumen, BUR and Polyiso roofing systems. Application is recommended for membrane attachment to both horizontal and vertical surfaces.
- LiquiGard™ adheres aggressively to **concrete, steel, Firestone polyiso, other approved insulations and most construction materials.** Surfaces must be clean and dry.

LiquiGard™

Mixing

- Mix Part A and Part B with an 8” mud blade for a minimum of **3 minutes**.

- **<u>Do not mix partial containers.</u>**

- **<u>Do not mix by hand.</u>**

- LiquiGard™ should be at least ***60°F*** when mixed and applied.

LiquiGard™
Application

• Ensure that substrates are clean, dry, smooth, and free of sharp edges or other contaminants.

• Ambient and substrate temperatures during application should be ***45° and rising***.

• **All material should be applied within 30 minutes after mixing**. Warmer temperatures **reduce** the working time.

LiquiGard™

Application

• For membranes, apply LiquiGard™ in full coverage using a **¼" notched squeegee**. Trowels can be used for adhering flashings and other small applications.

• Polyiso insulation is adhered in a ***continuous*** layer of LiquiGard™.

LiquiGard™

Application

• Allow for some bleed out at the side and end laps to ensure that the laps are ***properly sealed***.

LiquiGard™

Application

• Casting granules into the exposed LiquiGard™ is an option that offers a clean, finished look.

LiquiGard™

- For more technical information and updates regarding LiquiGard™ Adhesive visit www.firestonebpco.com

Questions?